

**Research
Opportunities
in the
Rocky Mountain
Region**



National Park Service



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INTRODUCTION

This catalog is for persons interested in advancing the quality of our national parks through scientific and cultural research. It is an "idea book" that lists research needs for natural resources, cultural resources, and social science topics in 41 park areas of the Rocky Mountain Region. Research projects may range from answering unknown questions about park resources to inventorying the resources within the park. In addition, researchers are welcome to approach the parks with project ideas other than those listed in this document.

The national parks are fertile ground for scientific and cultural inquiry because of the Park Service's long-standing commitment and programs dedicated to understanding, protecting, and managing its resources. Park personnel are both dedicated protectors and students of the landscapes, ecosystems, and historic/prehistoric features of these nationally significant areas. Our resource personnel are anxious to advise prospective researchers throughout the duration of their projects, and to identify support items the Service can offer to help defray some expenses. A full listing of the types of assistance offered by the various park units can be found in a table (pg. iv) following the regional map.

The intent of this catalog is to solicit assistance from students, scientists, and organizations who are willing to pursue studies with basically their own resources. In the case of private organizations, the catalog will identify opportunities for them to support research activities that are not normally undertaken by the park research or management staffs because of the Service's limited budget. The support can range from donations for specialized research equipment to financing of a complete research project.

We encourage you to read further if you are among the following:

* University students, both masters and doctoral candidates, or university or college faculty members looking for interesting research subjects. (Under-

graduate students will be considered for some projects.)

* Professionals in search of projects that may be funded by grants from nongovernmental institutions.

* Private or other research institutions interested in studying park resources.

* Corporations, profit and nonprofit, interested in extending good-will assistance and identifying themselves with the purpose of the national parks.

* Benefactors who want to provide financial or other support to advance research in the parks.

* Qualified individuals, retired or otherwise, who would like to pursue individual research interests or in other ways volunteer time and expertise to advance research or publish information about the parks.

The individual park entries in the catalog list people to contact in the parks for further information on any project. In addition, the researcher should contact the following individuals:

Natural Resources:

Dan Huff, Regional Chief Scientist
or Bob Schiller, Assistant Regional Chief Scientist
Rocky Mountain Regional Office
P.O. Box 25267
Denver, CO 80225
(303) 969-2650 or 969-2651

Cultural Resources:

Rodd L. Wheaton
Chief, Division of Cultural Resources
National Park Service
Rocky Mountain Regional Office
P.O. Box 25267
Denver, CO 80225
(303) 969-2875

A few tips on how to use the catalog are necessary. The catalog does not prioritize nor alphabetize research projects for the parks. To assist researchers in identifying the projects that best meet their interests, there is an index of disciplines at the end of the catalog. Please note that when a discipline is indexed for a page, it may appear more than once on that page. In addition, in order to keep the catalog as short and consistent as possible, the names of some disciplines were not used when another name would apply. For example, wildlife management projects are indexed under 'Wildlife Biology.' On other hand, for other more generalized disciplines such as 'Ecology,' subdisciplines are listed. Lastly, researchers who are specifically interested in rare and endangered species will find related projects indexed under 'Rare and Endangered Species' as well as under the associated disciplines.

As unique 'laboratories' of natural processes and cultural evolution, the national parks offer an unparalleled collection of resources that represent our national heritage. We hope that this publication stimulates your thoughts about research opportunities in the parks and leads you to a rewarding association with the National Park Service.



Regional Director
Rocky Mountain Region
National Park Service

Parklands of the Rocky Mountain Region



NB - National Battlefield
NHS - National Historic Site
NM - National Monument

N MEM - National Memorial
NP - National Park
NRA - National Recreation Area

Park Support for Researchers

Each park has identified assistance items that may be available to researchers working in the parks. Availability of items will vary with year and season and will depend on the priority of the project. Negotiations for assistance will be made between the park and the researcher on a case-by-case basis. Please contact the park for details on the particular items.

[illegible]

*Special Equipment may include items such as binoculars, spotting scopes, microscopes, on a photograph, laboratory glass and tools.

** "Volunteers in Parks" Assistance varies but may include free rent, government driver's license, workman's compensation liability coverage, and gas diem.



Arches National Park

PARK DESCRIPTION:

Arches National Park encompasses more than 115 square miles and preserves an outstanding concentration of natural rock arches, windows, fins, and spires. The area became a national monument in 1929 and a national park in 1971. The land surface is mostly bedrock or thin soils. There are several unusual plant communities including hanging gardens and cryptogamic crusts. Endangered bird and fish species occur in or adjacent to the park. Desert bighorn sheep have been reintroduced. There is evidence of prehistoric occupation, and historic sites date from the period of exploration, settlement, park establishment, and early park development.

NATURAL RESOURCE/SOCIAL SCIENCE RESEARCH NEEDS:

Flowering Patterns of C4 Grasses -- C4 grasses generally flower in late summer, but observations in the park indicate a more opportunistic pattern. Studies are needed to determine whether flowering time is controlled by environmental cues or by internal characteristics. (Plant Ecology, Plant Physiology, Botany)

Raptor Reproductive Success -- Determine what factors may influence nesting success. Raptor nesting success in some areas of the park has been low despite efforts to reduce visitor intrusion. (Ornithology, Avian Ecology)

Recent Geology -- Investigate the extent of deformation of Quaternary deposits in Salt Valley and its presumable cause, the underlying salt anticline collapse. Develop interpretive materials. (Geology, Interpretation)

Rare and Endangered Species -- Determine the condition of rare species. Research would examine population dynamics, current status, expansion potential, and possible development and/or visitor conflict threats. (Ecology, Botany, Zoology, Aquatic Ecology, Ornithology)

Nesting Raptors -- Survey the nesting habitat and range for all raptors and ravens to determine the density and population dynamics. (Avian Ecology, Ornithology)

Vegetation Rehabilitation and Protection -- Collect data and historical information on soils and vegetation to determine the best methods for restoring the native vegetation. (Botany, Restoration Ecology, Plant Taxonomy, Range Science, Soil Science)

Mammalian Predators -- Research the population size, distribution, prey base, habitat use, and requirements for mountain lions, bobcats, and coyotes. Investigate the predator relationships with newly introduced desert bighorn sheep and adjacent land uses. (Animal Ecology, Wildlife Biology, Biogeography)

Pronghorn Reintroduction -- Research the feasibility of the reintroduction of pronghorn and assess the potential conflicts with reintroduced bighorn sheep. (Animal Ecology, Wildlife Biology, Range Science)

Backcountry Management -- Investigate visitor attitudes, behaviors, and preferences on backcountry use levels and management techniques. Integrate biophysical impact data and visitor attitudes to estimate acceptable use levels in different park zones. (Recreation Management, Sociology, Natural Resource Management)

Pristine Natural Areas -- Survey baseline conditions and community parameters of pristine areas and compare with disturbed areas to determine the degree of disturbance and potential for recovery. (Ecology, Botany, Wildlife Biology)

Hanging Garden Plant Communities -- Survey the hanging gardens to determine the status of this sensitive habitat. Compare the hanging garden communities of the same type in different areas of the park. (Plant Ecology, Botany)

Pre-Columbian Plant Communities -- Identify the species composition of pre-Columbian plants in areas in the park that were disturbed during the last 150-200 years, and that have been preserved for only the last 10-20 years. Methods could include comparing phytoliths and carbon isotope ratios in recently produced soil with older soils; quantitatively comparing plant species composition of relict areas with disturbed areas that have similar physical environments; and identifying pack rat midden contents using radiocarbon dating. (Ecology, Plant Ecology, Plant Taxonomy, Chemistry, Soil Science)

Pothole Ecology -- Study ephemeral rock pool invertebrate population dynamics, island biogeography, community structure, productivity, nutrient dynamics, and their importance to terrestrial systems. (Aquatic Ecology)

Invertebrate Ecology -- Study invertebrate ecology, develop a species list, and collect specimens. Studies may include: (1) plant-herbivore interactions (especially single leaf ash and milk bug), (2) pollination, and (3) vertebrate parasites. (Insect Ecology, Entomology, Invertebrate Zoology, Invertebrate Taxonomy)

Disturbed Sites Reclamation -- Research reclamation techniques to answer the following questions: (1) Is revegetation sufficient to reclaim an area and will wildlife return without reintroduction efforts? (2) What are the germination requirements for the dominant species in each habitat type? (3) What is the viability of seed collected for revegetation? (4) What environmental conditions best enhance the establishment of seedlings, whether planted as seeds or tublings? (5) Can cryptogamic crusts be reintroduced using slurries of cryptogams from other sites; will those slurries taken from other sites recover on their own; what would be included in a slurry mix (e.g., added nutrients, soil binders, etc.); do all

species in a cryptogamic crust need to be in the slurry for successful recolonization? (Plant Ecology, Plant Physiology, Microbiology, Restoration Ecology)

Tamarisk Ecology -- Study the dispersal and establishment mechanisms of tamarisk at different sites and the potential for biological, chemical, or integrated pest management control. (Plant Ecology, Plant Physiology, Plant Pathology, Insect Ecology, Pest Management)

Vegetation/Environment Relationships -- Survey the plant communities to update and refine vegetation maps, and correlate plant communities with various environmental factors (e.g., soil type, aspect, parent rock, elevation, etc.). Make use of the available Geographic Information System (GIS) data, generating new data on overlays suitable for digitizing, and incorporating into GIS. (Plant Ecology, Geography, Computer Science, Soil Science, Geology)

Plant Diseases -- Study the mechanisms causing foliage damage of Utah juniper. (Preliminary studies suggest a serious disease that may be correlated with park roads.) Identify the pathogens and recommend treatment. (Plant Pathology, Plant Ecology, Insect Ecology)

Community Comparisons -- Assess the degree of similarity among widely separated, but seemingly similar plant and animal communities. (Animal Ecology, Insect Ecology, Plant Ecology)

Campground Use and Resource Impacts -- Study the effects of concentrated human activities on surrounding natural areas including vegetation, vertebrates, and invertebrates. (Ecology, Plant Ecology, Animal Ecology, Insect Ecology, Recreation Management, Sociology)

Water Relations of Selected Plant Species -- Compare the water use rates of the native and non-native riparian plant species, addressing both equivalent leaf area and actual plant density at a site. Determine what role water consumption plays in the exclusion of native annuals and perennials by non-native annuals. (Plant Ecology, Plant Physiology)

Outdoor Recreational Vehicle (ORV) Impacts -- Document the impacts on wildlife and vegetation, or document and compare the impacts of different kinds of ORV's (mountain bikes, all-terrain vehicles,

four-by-four vehicles, motorcycles). Recommend management solutions to reduce impacts. (Ecology, Plant Ecology, Animal Ecology, Sociology, Recreation Management)

Air Pollution Damage -- Pinpoint sensitive areas and species, and document the damage, paying special attention to potholes, cryptogams, or sensitive species that may act as bioindicators. (Chemistry, Botany, Atmospheric Science)

Cryptogamic Studies -- Study the general cryptogam ecology including factors controlling distribution, species diversity, nitrogen-fixing capabilities, and response to disturbance. (Plant Ecology, Botany)

Deer Ecology -- Determine the population structure, distribution, and forage utilization. (Wildlife Biology, Animal Ecology)

Flora -- Survey the park, compile an updated plant list, and collect specimens for the herbarium. (Botany, Plant Taxonomy)

Cacti -- Survey cacti, determine species, and examine the clinal variations among species. (Botany, Plant Taxonomy, Plant Ecology)

Biogeography of Plants on the Colorado Plateau -- Survey plant communities in the area and examine the relationships between them, past and present. (Biogeography, Botany, Plant Ecology)

Exotic Plants -- Study the ecology of exotic plant species (such as *Tamarix ramosissima*, *Bromus tectorum*, *Salsola iberica*, and *Centaurea repens*) and determine the population dynamics, community structure, water relations, and factors enabling invasion. Determine control options. (Botany, Plant Ecology)

Rare Plants -- Verify and map rare plant populations. Identify plant numbers, population boundaries, and habitat characteristics. Survey the area for similar habitats to determine the expansion potential. (Botany, Plant Ecology)

Plant Community Structure -- Study isolated plant communities, identify age, population dynamics, community structure, and possible origins (using pack rat middens, core samples, electrophoresis, etc.). The communities include Douglas fir,

ponderosa pine, aspen, and manzanita. (Plant Ecology, Botany, Paleontology, Biochemistry, Biogeography)

Bioindicators -- Determine which species are bioindicators, and to which type of disturbance they are sensitive. (Ecology, Biology, Chemistry)

Mammals, Reptiles, and Amphibians -- Determine distribution, population status, and habitat requirements of the mammal, reptile, and amphibian species. (Wildlife Biology, Herpetology, Animal Ecology)

Riparian Bird -- Survey the riparian bird species during migration and nonmigration periods. Document their habitat use and susceptibility to disturbance. (Ornithology, Avian Ecology)

Plant Productivity -- Establish the productivity of selected plant species and habitats within the ungrazed park portions, and compare with data gathered from other parks that allow grazing. (Botany, Plant Ecology, Range Science)

Radiological Monitoring -- Monitor radiation levels in the park headquarters area to determine if levels are unacceptable for the visitors' and employees' health. (Radiation Biology, Environmental Science)

SOCIAL SCIENCE RESEARCH NEEDS:

Backcountry Use/Wildlife Interactions -- Document the impacts of backcountry camping and day hiking on wildlife, and make recommendations for management actions to minimize the conflicts. (Recreation Management, Wildlife Biology, Sociology)

ORV Impacts on Visitor Experience -- Document the impacts of ORV use on the quality of other visitors' experiences, and make recommendations for management. (Sociology, Recreation Management)

CULTURAL RESOURCE RESEARCH NEEDS:

Historic Roads -- Locate, map, and describe the abandoned roads and dugways. Research and assess these for architectural and historic significance. (Architecture, History)

Administrative History - Complete a park administrative history including the establishment, numerous boundary changes, changes from monument to park designation, and changes in permitted activities (History)

Museum Collection Management - Update the curatorial records to comply with new National Park Service procedures. (Museology)

Rock Art Conservation - Determine both the natural and human impacts on rock art sites, and develop specific strategies for performing the necessary conservation work. (Art Preservation)

Museum Collection - Inventory and compile a complete cultural collections catalog. (Museology)

Cultural Resource Base Map - Prepare a map locating cultural resources consistent with existing cultural resource inventories and National Park Service classification systems. (History, Archaeology)

Archaeological Surveys - Select specific areas for additional archaeological inventory. Evaluate the sites identified for the National Register of Historic Places (Archaeology)

Contexts of Significance - Prepare the prehistoric and historic contexts of significance that would be used in evaluating cultural properties eligible for the National Register of Historic Places. This can be addressed as one or two projects. (History, Archaeology)

WHO TO CONTACT

Natural Resources

Chief, Division of Resource Management or
Natural Resources Management Specialist
Arches National Park
125 W. 200 S.
Moab, UT 84532
(801) 255-7164

Cultural Resources

Archaeologist
Arches National Park
125 W. 200 S.
Moab, UT 84532
(801) 255-7164

Chief Ranger
Arches National Park
P.O. Box 907
Moab, UT 84532
(801) 255-8161



South Dakota

Badlands National Park

PARK DESCRIPTION

Badlands National Park protects dramatic canyons, eroded peaks and ridges, a rich trove of Oligocene mammal fossils, the finest surviving example of mixed grass prairie, and human history dating across 11,000 years. The park encompasses 243,300 acres, 123,300 acres of which are in the Pine Ridge Indian Reservation. Congress has designated 54,144 acres as wilderness. Approximately 40 percent of the park is barren, scenic badlands. The remainder is mixed grass prairie supporting bison, mule deer, pronghorn, bighorn sheep, prairie dogs, and other wildlife species.

NATURAL RESOURCE RESEARCH NEEDS

Impacts of Overflights on Raptors - Document impacts of low-flying aircraft on large raptors. (Ornithology, Avian Ecology)

Threatened Raptors - Identify and gather baseline data on the various species of threatened raptors occurring in the park, and the number of individuals of each species. (Ornithology)

Mammalian Predators - Survey the large mammalian predator populations including coyote, fox, badger, and bobcat. (Wildlife Biology)

Bighorn Sheep - Determine the forage used by bighorn sheep, and evaluate for suitable habitats. (Wildlife Biology)

Reintroduced Elk/Ungulate Interchanges - Determine what effects elk reintroduction would have on deer, pronghorn, bighorn, and bison. (Wildlife Biology)

Vertebrate Species - Survey the South Unit to develop a vertebrate species list, identify distribution, and document relative abundance. This information will be used for wildlife management and to develop plans for reintroducing extirpated native species. (Wildlife Biology, Zoology)

Aquatic Communities - Survey the White River, Fog Creek, and Sage Creek areas to collect baseline data on composition of aquatic communities. (Aquatic Ecology)

Plant Communities - Inventory, classify, and map plant distributions. (Botany, Plant Taxonomy)

Soil Fossils - Observe recently reconstructed soil boxes and determine what factors limit population size and viability. (Wildlife Biology)

Fog Creek Basin Geomorphology - Study rapid erosion and stream channeling impacts on cultural resources. (Geology, Geomorphology)

Paleontology Research - Compile a organized listing of all paleontological research conducted in the Badlands since 1949. Include the collector's names, specimens collected, collection dates, and institution retaining the specimens. (Paleontology, History)

CULTURAL RESOURCE RESEARCH NEEDS

Aboveground Resources - Identify and evaluate the existing structures for possible nomination to the National Register of Historic Places and placement on National Park Service List of Classified Structures. (History, Architecture)

Oral History - Preserve the oral history of early Black
settlers residents through systematic questioning of
residents and/or their children about the events and
conditions of the late 18th and 19th centuries. (Oral
History, Anthropology)

Early American Cultural Sites - Survey and map the
early American cultural sites including the (18th, 19th
century, etc.) at Fort Creek and at Pinnacle and Early
Life Overlook. Evaluate any identified sites for
eligibility to the National Register of Historic Places.
(Archaeology, Anthropology)

WHO TO CONTACT:

Chief Ranger
or Chief Naturalist
Bachelder National Park
P.O. Box 8
Dexter, SD 57730
(605) 437-5361



Colorado

Bent's Old Fort National Historic Site

PARK DESCRIPTION

Bent's Old Fort National Historic Site was established in 1976 to reconstruct the adobe trading post established by the Bent, St. Vrain Company (1823-1849) along the Santa Fe Trail. The post became a principal outpost of civilization and a rendezvous for Indians on the Southern Plains in the early 1800s, and developed into the center of a vast western fur trading empire. The site encompasses more than 700 acres.

NATURAL RESOURCE RESEARCH NEEDS

Plant Species -- Prepare a native and exotic plant species list and prepare the voucher specimen herbarium sheets. (Plant Taxonomy)

Animal Species -- Prepare a species list of mammals, birds, reptiles, fish, and insects. (Mammalogy, Ornithology, Herpetology, Ichthyology, Entomology)

Vegetation Patterns Maps -- Prepare baseline maps of the present and historic plant distributions. (Botany)

Land Use -- Document the land use of the historic site since 1849. Examine the courthouse and other records detailing property sale, taxes on crops, etc., to identify the land use, plant cover, and ecosystem impact. (Natural Resource Management, Ecology, History)

River Dynamics -- Document the Arkansas River stream bed changes since 1800 to the present. (Hydrology)

Flood Security Planning -- Prepare a topographic map showing historic flood stages and the 100- and 500-year flood plains. (Hydrology)

CULTURAL RESOURCE RESEARCH NEEDS

Native Plant Use -- Research the usage of native native plants for food and medicine during the Bent, St. Vrain era. (History)

Native American Lifestyles -- Study Cheyenne, Arapaho, and Comanche lifestyles circa 1820-1849. (Anthropology)

Bent Family History -- Trace the Bent family tree from the 1800s to the present. (History)

Hispanic Residents -- Document the Hispanic resident's lifestyle in the early Southwest. (History, Anthropology)

History Research Design -- Develop a research design for Bent's Old Fort so that needed historical information and primary source data can be acquired in an orderly fashion. (History)

Archaeology -- Undertake a detailed archaeological excavation and develop the plans for reconstruction. The recently discovered underground room outside the main fort requires a detailed archaeological excavation and plans for reconstruction. (Archaeology)

Native Americans -- Develop a program to have Native Americans do a living history for the fort's interpretive program. (Interpretation)

WHO TO CONTACT:

Chief Ranger
Bent's Old Fort National Historic Site
35110 Highway 104 East
La Junta, CO 81050-9523
(719) 384-2500



Bighorn Canyon National Recreation Area

PARK DESCRIPTION:

Bighorn Canyon National Recreation Area is best known for the 71 mile Bighorn Lake formed by the Yellowstone Dam which is on the Bighorn River. The 12,700 acre fresh water reservoir, however, is only a small part of the 64,000 acre recreation area. Bighorn Canyon offers a diverse landscape of valleys, upland prairies, forests, mountains, and deep canyons. The vegetation mosaic includes wetlands, desert shrublands, shifting riparian communities, juniper woodlands, sagebrush steppes, coniferous forests, and mixed grass prairie. These lands offer a proposed wilderness area, fishing, limited hunting, spectacular geological formations, archeological sites, numerous small shrublands and caves, historic ranches, and a great diversity of plants and animals.

NATURAL RESOURCE RESEARCH NEEDS:

Nonvascular Plants - Inventory the nonvascular flora to consolidate data, identify information voids, and protect rare species. (Plant Taxonomy, Botany, Microbiology)

Bighorn Sheep - Analyze sheep range expansion, dispersal, and habitat outside the core use areas. Analyze changes in neonatal survival and/or herd composition in order to make timely recommendations regarding supplemental introductions to diversify the gene pool of the small, isolated populations. Determine the optimum population level for bighorn sheep in relation to competition with wild horses and mule deer. Analyze sheep fecal nitrogen levels to establish their nutritional well-being during rapid population expansions. Establish permanent forage production plots. (Wildlife Biology, Genetics)

Bighorn Cave - Continue the inventory and underground survey of the Bighorn Caverns. (Geology, Biology, Speleology)

Invertebrate Inventory - Conduct an inventory of invertebrates by increments. Insects could be dealt with by individual order or, e.g., just the aquatic macroinvertebrates. Mollusks and crustaceans could be handled separately. (Invertebrate Taxonomy)

Great Horned Owl and Golden Eagle Nesting Sites - Locate and map the territories of great horned owl and golden eagle nests. (Ornithology)

Noxious Weeds - Map the distribution of noxious weeds listed by the states of Montana and Wyoming. (Plant Taxonomy, Botany)

Bat Survey - Conduct a systematic inventory of small caves and grottoes as part of obtaining a better understanding of the bat fauna. Identify hibernacula, roosts, and sites used as nurseries. Two documented records for the spotted bats exist in the park files. (Wildlife Biology, Mammalogy)

CULTURAL RESOURCE RESEARCH NEEDS:

Archeological Surveys - Systematically survey and map the archeological resources. (Archeology)

Lockhart Ranch Report - Complete the Historic Structure Report for the Lockhart Ranch. (History, Architecture)

Museum Collection - Update the curatorial records to comply with new National Park Service procedures. (Museology)

Yellowtail Dam – Research Yellowtail Dam construction history while the people who were involved in the construction are still alive and records are reasonably easy to obtain. (History)

Bighorn River Boating – Study the history of boats and boating on the Bighorn River. (History)

Historic Resource Base Map – Prepare a base map showing the location for historic ranches, homesteads, military actions, cattle ranching activities, mining, trails, fur trading activities, and dude ranching. (History, Geography)

Cribbed Log Structures – Document and map atypical cribbed log structures in the Pretty Creek area, before they deteriorate further and disappear. (Archaeology)

WHO TO CONTACT:

Natural Resources:

Resource Management Specialist
Bighorn Canyon National Recreation Area
Lovell, WY 82431
(307) 548-2251

Cultural Resources:

Chief Interpreter
Bighorn Canyon National Recreation Area
Fort Smith, MT 59035
(406) 695-2412



Big Hole National Battlefield

PARK DESCRIPTION:

Big Hole National Battlefield commemorates the battle fought on August 9 and 10, 1877, between the Nez Perce Indians and the United States Army. Although called a victory for the Indians, it was a turning point in the Nez Perce Indian War of 1877. Less than 2 months later, the Nez Perce surrendered. The 655-acre site includes the Indian camp, siege area, and battle site. A small visitor center houses exhibits, a slide presentation room, and the museum collection.

NATURAL RESOURCE RESEARCH NEEDS:

Landscape Restoration Impacts – Monitor the effects of restoration of cultural landscapes on wildlife and vegetation. (Ecology)

Flora and Fauna – Survey the baseline flora and fauna conditions. Add missing plant specimens to the herbarium and begin a small mammal, bird, and insect collection. (Botany, Wildlife Biology, Entomology)

CULTURAL RESOURCE RESEARCH NEEDS:

Big Hole Battle Bibliography – Develop an annotated bibliography of books, articles, and manuscripts on the battle participants and the Nez Perce Indian War. (History)

Battle Participants – Identify the battle participants and prepare histories for each. Organize and analyze the copies of original data from participating Nez Perce Indians. Trace the disposition of the military, civilians, and Nez Perce Indians using records, reports and documents, and physical evidence. (History)

7th Infantry – Analyze the 7th Infantry structure, command, officers, etc., to explain why only certain companies and officers were present at the battle and to offer insight into their performance. (History)

WHO TO CONTACT:

Chief of Interpretation and
Resource Management
Big Hole National Battlefield
P.O. Box 237
Wadsworth, MT 59761
(406) 685-3155



Black Canyon of the Gunnison National Monument

PARK DESCRIPTION

The Black Canyon of the Gunnison National Monument was established by President Herbert H. Hoover (Proclamation Number 2033) on March 2, 1933. The proclamation in part cited "...for the preservation of the spectacular gorges and addition of features of scenic, scientific, and educational interest."

The Black Canyon is a textbook example of a super-imposed stream. The canyon walls rise precipitously 2,000 feet or more above the Gunnison River, which roars in the canyon depths at a 95 foot per mile gradient.

The Black Canyon is one of the world's foremost wild canyons. The ancestral Gunnison River was contained by volcanic deposits and compelled to an unchanging course. It carved 50 miles of narrow, awesome canyon through hard Precambrian metamorphic rock. The most spectacular 12 miles are within the national monument.

The monument's varied ecosystems provide habitat for a variety of wildlife including: mule deer, bighorn sheep, black bear, wintering elk, golden eagle, endangered peregrine falcon, bobcat, coyote, cougar, badger, porcupine, river otter, and several game and nongame fish species. There is evidence of seasonal use during prehistoric times.

NATURAL RESOURCE/SOCIAL SCIENCE RESEARCH NEEDS:

Porcupine/Pinyon Pine Relationship - Research the relationship between porcupines and pinyon pine trees and determine the effects of porcupine feeding on the survival of individual trees. Since the monument was established in 1933, there have been

various programs to eliminate or reduce porcupine numbers because of their supposed detrimental effects on pinyon trees. (Plant Ecology, Vertebrate Pest Management)

Altered River Flow Impacts - Study and compare pre-dam research findings with post-dam conditions of temperature, turbidity, flow, and fauna. (Hydrology, Plant Ecology, Animal Ecology)

Exotic Plants - Research non-native plant encroachment of tamarisk, chinese elm, and matrimony vine, and determine the most effective way to control or eliminate these plants. (Plant Ecology, Integrated Pest Management)

Peregrine Falcons - Survey the canyon to identify the historic eyries and to document the number of endangered peregrines nesting in the park. (Ornithology)

Endangered Fish - Survey the Gunnison River to determine if the historically present bonytail chub, Colorado cutthroat trout and/or Colorado River squawfish still occur within the monument. (Ichthyology)

River Otter - Study the recent reintroduction of the river otter by the Colorado Division of Wildlife and determine its success. (Wildlife Biology)

Bighorn Sheep - Determine the success of the 1986 reintroduction of bighorn sheep within the canyon, monitor the health of the sheep herd, and determine which areas and management techniques will provide the best opportunity for successful reintroduction. (Wildlife Biology)

Pine - Study and record wildlife history on bison management information. Also study the wildlife of

fects on Black Canyon's vegetation and determine the impacts of 40 years of fire suppression management. (Fire Ecology)

Water Quality - Determine the impacts of agricultural practices within Bosawick Park on the water quality of the Red Rock drainage and the Gunnison River within the park. (Aquatic Ecology)

Visitor Impacts on Ponderosa Pine - Study visitor impacts on a relict stand of ponderosa pine and determine the best technique of protection management. Conduct research on stand age, reproductive potential, stand viability, and the effects of altered river flows. (Plant Ecology, Recreation Management, Sociology)

Endangered Plants - Survey the monument for suspected populations of endangered plants (especially *Asclepias crandallii*, *Asclepias densa*, *Asclepias densa*, and *Penstemon lanceolatus*). (Plant Taxonomy, Plant Ecology)

Plant Survey - Survey the less accessible areas of the canyon (walls and bottom) to determine the existing plant species. (Plant Taxonomy, Plant Ecology)

Visitor Impacts Along Trails - Determine the rate at which visitors accelerate the downward rock migration along talus slope trails. Determine the extent to which the accelerated erosion impacts the flora and fauna on talus slopes. (Recreation Management, Plant Ecology, Animal Ecology)

CULTURAL RESOURCE RESEARCH NEEDS:

Archaeological Survey - A recent boundary expansion added an archaeologically rich area of 4,000 acres. This new park land needs to be surveyed to locate archaeological sites and determine their significance. (Archaeology)

Administrative History - Compile the park's administrative history, update the 1933 to 1966 volume, compile 1966 to present. (History)

Museum Collection - Update the curatorial records to comply with new National Park Service procedures. (Museology)

WHO TO CONTACT:

Superintendent

or Chief Ranger

Black Canyon of the Gunnison National Monument

Montrose, CO 81402

(303) 249-7036



Bryce Canyon National Park

PARK DESCRIPTION:

Bryce Canyon National Park was established as a national monument in 1923 and designated a national park in 1934. The park was established for the benefit and enjoyment of the people, for the preservation of the land in its natural state, and for preservation of the outstanding scenic features. The park is noted for its outstanding geologic features, scenic vistas, night skies, superb air quality, extreme quiet, wildlife, and a wide variety of plant communities. Little is known about the park's cultural resources although there is evidence of prehistoric sites dating back from 1,500 to 4,500 years ago. As a complex, Bryce's sites stand out as having the potential to yield significant information on southern Utah prehistory. Historic sites record periods of settlement and recreational development.

NATURAL RESOURCE/SOCIAL SCIENCE RESEARCH NEEDS:

Carrying Capacity – Determine the park's biological and sociological carrying capacity. (Biology, Natural Resource Management, Recreation Management, Sociology)

Water Resources – Determine the park's potable water source carrying capacity. (Hydrology)

Endangered Plant Habitat – Characterize the habitat requirements of known endangered or listed plant species to enable management to identify potential habitats. (Plant Ecology, Soil Science)

Water Resources – Research the effects of pumping groundwater on meadow ecology. (Hydrology, Ecology)

Baseline Inventories – Conduct baseline inventories of insects, reptiles, amphibians, fungi, and lichens. (Entomology, Herpetology, Mycology)

Vegetation Management – Develop methods of establishing native plant materials in areas for which there is currently no expertise (e.g. sedges, threatened or endangered species). (Plant Ecology)

Park Herbarium Records Update – Update the park's herbarium collection by correcting botanical nomenclature and species identification. Collect type specimens missing from the park's collection. (Plant Taxonomy)

Geographical Information System – Develop, map, and digitize (for use with SAQIS) information on park utility systems, recreation developments including lodging, campgrounds, viewpoints, trails, roads, and concessions facilities, and management facilities, including offices, housing, and maintenance yards. (Computer Science)

CULTURAL RESOURCE RESEARCH NEEDS:

Aboveground Resources – Evaluate all aboveground cultural resources for the National Register of Historic Places, and develop a comprehensive nomination package in accordance with the National Historic Preservation Act of 1966 as amended in 1980. (History)

Archaeological Survey – Conduct archaeological surveys and determine the importance of the material to southern Utah archaeology and history. (Archaeology)

Archaeology – Develop archaeological contexts of significance and evaluate all known sites for eligibility to the National Register of Historic Places. (Archaeology)

WHO TO CONTACT:

Resource Management
Bryce Canyon National Park
Bryce Canyon, UT 84717
(801) 834-5322



Canyonlands National Park

PARK DESCRIPTION:

Canyonlands National Park preserves approximately 450 square miles of spectacular canyons and mesas in southeastern Utah. Established in 1964, the park includes the confluence of the Green and Colorado Rivers which are entrenched in canyons up to 1,000 feet deep. These canyons divide the park into three distinct areas: the Needles District east of the Colorado River, the Maze District west of the Green and Colorado Rivers, and the Island in the Sky District between the two rivers. Elevations range from about 3,750 feet to nearly 7,000 feet creating a wide variety of physical conditions. Intricately cut canyon systems support many different biotic communities. Evidence of prehistoric human occupation is extensive and Indian and settler historic sites are also preserved.

NATURAL RESOURCE/SOCIAL SCIENCE RESEARCH NEEDS:

Natural Areas – Study and survey the baseline conditions and any unusual ecological factors of flora and fauna in the pristine areas. Compare community parameters of these pristine areas with the disturbed areas of the park to determine the degree of disturbance and the potential for recovery. (Ecology, Botany, Wildlife Biology)

Backcountry Use/Wildlife Interactions – Document the impacts of backcountry camping and increasing volumes of day hiking on wildlife, and make recommendations for management actions to minimize conflicts. (Ecology, Wildlife Biology, Sociology)

Nesting Raptors – Survey nesting habitat and determine the range for all raptors, raven, and owls to determine their density and population dynamics. (Avian Ecology, Ornithology)

Desert Bighorn Sheep – Study the bighorn sheep population in the Needles District, which has recently declined apparently as a result of disease. Determine the cause of decline, whether the herd will die out or stabilize, and provide recommendations to park managers for future management of the herd. Also, study the relationship between mountain lions and bighorn sheep, and determine whether mountain lions are affecting the number of bighorn sheep. On another project, study the Island in the Sky herd to determine carrying capacity, impacts of a transplant program on population dynamics, and impacts on increases in visitor/sheep interactions. (Animal Ecology, Wildlife Biology, Animal Pathology)

Hanging Gardens – Locate, measure, map and photograph the hanging gardens to determine the status of this sensitive habitat. Classify them according to physical characteristics. Compare similar types of hanging garden communities throughout the park. (Plant Ecology, Botany)

Mammalian Predators – Study the ecology of mountain lions, bobcats, coyotes, badgers, foxes, and ringtails. Study the potential impact that increasing numbers of visitors and/or hunting and trapping outside the park are having on these predators. Study the relationship between mountain lion predation and bighorn sheep numbers. (Animal Ecology, Wildlife Biology, Sociology)

Pre-Columbian Plant Communities – Identify species composition of pre-Columbian plants in areas of the park that were disturbed during the last 150-200 years, and that have been preserved for only the last 10-20 years. Methods may include: (1) comparing phytoliths and carbon isotope ratios in recently produced soil with older soils, (2) quantitatively comparing plant species composition of relief areas with disturbed areas that have a similar physical environment, and (3) identifying pack rat midden contents.

using radiocarbon dating. (Ecology, Plant Ecology, Plant Taxonomy, Chemistry, Soil Science)

Pothole Ecology -- Study ephemeral rock pool invertebrate population dynamics, community structure and island biogeography, productivity, nutrient dynamics, and their importance to terrestrial systems. (Aquatic Ecology)

Invertebrate Ecology -- Study invertebrate ecology, develop a species list and collect specimens. Studies may include: (1) plant-herbivore interactions (especially single leaf ash and mind bug), (2) pollination, and (3) vertebrate parasites. (Invertebrate Taxonomy, Insect Ecology, Entomology)

Disturbed Sites Reclamation -- Research reclamation techniques to answer the following questions: (1) Is revegetation sufficient to reclaim an area and will wildlife return without reintroduction efforts? (2) What are the germination requirements of at least the dominant species in each habitat? (3) What is the viability of native seed collected for revegetation? (4) What environmental conditions best enhance establishment of seedlings, whether planted as seeds or tublings? (5) Can cryptogamic crusts be reintroduced using slurries of cryptogams from other sites; will those slurries taken from other sites recover on their own; what would be included in a slurry mix (e.g. added nutrients, soil binders, etc.); do all species in a cryptogamic crust need to be in the slurry for successful recolonization? (Plant Ecology, Plant Physiology, Microbiology, Restoration Ecology)

Ecology of Tamarisk -- Study the dispersal and establishment mechanisms of tamarisk at different sites; for example, comparing establishment along rivers to washes that are subject to periodic flooding. Study the potential for control through biological, chemical, integrated pest management actions. (Plant Ecology, Plant Physiology, Plant Pathology, Insect Ecology, Pest Management)

Relationship of Vegetation to Environment -- Survey plant communities to update and fine-tune vegetation maps of the park and correlate plant communities with various environmental factors (e.g. soil type, aspect, parent rock, elevation, etc.). Make use of the available Geographical Information System (GIS) data and generate data on overlays suitable for digitizing, and incorporating into GIS. (Plant Ecology, Geography, Computer Science, Soil Science, Geology)

Plant Diseases -- Study the mechanisms causing foliage damage of Utah juniper. (Preliminary studies suggest a serious disease that may be correlated with park roads.) Identify the pathogens and recommend treatment. (Plant Pathology, Plant Ecology, Insect Ecology)

Community Comparisons -- Assess the degree of similarity among widely separate, but seemingly similar plant and animal communities. (Ecology, Animal Ecology, Plant Ecology, Insect Ecology)

Campground Use and Impacts on Surrounding Communities -- Study the effects of concentrated human activities on surrounding natural areas including vegetation, vertebrates, and invertebrates. (Ecology, Plant Ecology, Animal Ecology, Insect Ecology, Recreation Management, Sociology)

Water Relations of Selected Plant Species -- Compare water use rates of native and non-native riparian plant species, addressing both equivalent leaf area and actual plant density at a site. Determine what role water consumption plays in the exclusion of native annuals and perennials by non-native annuals. (Plant Ecology, Plant Physiology)

Outdoor Recreational Vehicle (ORV) Impacts on Park Resources -- Document impacts on wildlife and/or vegetation, or impacts of different kinds of ORV's (mountain bikes, all-terrain vehicles, four-by-four vehicles, and motorcycles). Recommend management solutions to reduce impacts. (Ecology, Plant Ecology, Animal Ecology, Sociology)

Ecology of Endangered Fish of the Colorado River System -- Investigate any of the following topics: (1) Food habits and food web structure and dynamics, (2) Predators of young fish and what impact predation has on populations, (3) Impact of channelization on population dynamics, (4) Effects of regulated flows on population dynamics, (5) Identification of critical habitat characters and feasibility of manipulation to enhance existing habitat or to create more. (Aquatic Ecology, Fishery Biology)

Water Requirements of Riparian and/or Aquatic Ecosystems -- Ascertain the minimum needs both in terms of absolute water flows and minimum fluctuations to maintain native systems. (Aquatic Ecology, Plant Ecology, Animal Ecology)

Effect of Regulated Flows on Riparian Ecosystems

- Investigate and answer any of the following questions: (1) How would riparian ecosystems in Canyonlands change if the Colorado and Green Rivers became more regulated? (2) Would establishment patterns of native and non-native plant species change (e.g., cottonwoods require periodic large floods for germination)? (3) Would animal populations (e.g., beaver and many bird species) be impacted? (Ecology, Plant Physiology, Plant Ecology, Animal Ecology, Limnology)

Sedimentary Dynamics in Relation to Flow Rates and Seasonal Patterns - Study the interactions between flow rates and sedimentation patterns to determine the factors involved in the formation of sand bars and associated backwaters, as well as other critical habitats for aquatic and/or riparian plants and animals. Create a computer model for hydrologic sedimentation patterns at different flow rates and channel widths. (Hydrology, Limnology, Computer Science)

Significance of Riparian Areas to Endangered Birds - Study the relationship between the riparian areas and both the bald eagle and peregrine falcon which use the river corridors much more than they do other areas of the parks. Determine whether these relationships would be altered by regulated water flows. (Avian Ecology, Ornithology)

Comparisons between Green and Colorado River Ecosystems - Study whether physical differences between the two rivers (e.g., flow patterns, water quantities moved, sedimentation rates and patterns, and channel characteristics) translate into differences in habitat. Determine whether these habitat differences significantly affect community and/or ecosystem structure and function of either the aquatic or riparian systems of the two rivers. (Ecology, Aquatic Ecology, Hydrology, Computer Modeling)

Beaver Ecology - Study the distribution, population status, and habitat requirements of beaver that are found along the Colorado and Green Rivers. (Wildlife Biology, Biogeography, Animal Ecology)

Air Pollution Damage - Pinpoint sensitive areas and species and document the damage, paying special attention to potholes, cryptogams or sensitive species that may act as bioindicators. (Chemistry, Botany, Atmospheric Science)

Cryptogamic Studies - Study general ecology, including factors controlling distribution, species diversity, nitrogen-fixing capabilities, and response to disturbance. (Plant Ecology, Botany)

Deer Ecology - Determine the population structure, distribution and forage utilization. (Wildlife Biology, Animal Ecology)

Flora of Canyonlands National Park - Survey the park, compile an updated plant list, and collect specimens for the herbarium. (Plant Taxonomy, Botany)

Cacti Survey - Survey cacti, determine the species, and examine the clinal variations among species. (Botany, Plant Taxonomy, Plant Ecology)

Biogeography of Plants on the Colorado Plateau - Survey plant communities in the area and examine the relationships between them, both past and present. (Biogeography, Botany, Plant Ecology)

Exotic Plant Species - Study the ecology of exotic plant species (such as *Tamarix ramosissima*, *Bromus tectorum*, *Salix elaeagnifolia*, and *Centaurea repens*) determining population dynamics, community structure, and water relations, as well as mechanisms enabling their invasion. Examine the options for control. (Botany, Plant Ecology, Pest Management)

Rare Plant Survey - Establish and map the populations of rare plants. Survey the area to establish numbers of individuals and boundaries of the populations, as well as habitat characteristics where they are found. Survey the area for similar habitats to determine the potential for expansion. (Botany, Plant Ecology)

Plant Community Structure - Study the age and possible origins (using pack rat middens, core samples, electrophoresis, etc.) population dynamics, and community structure of isolated plant communities. These communities include pockets of Douglas fir, ponderosa pine, aspen, and manzanita. (Plant Ecology, Botany, Paleontology, Biochemistry)

Bioindicators - Identify the indicator species and the disturbances to which they are sensitive. (Ecology, Biology, Chemistry)

Mammals, Reptiles, and Amphibians – Determine the distribution, population status, and habitat requirements of the mammal, reptile, and amphibian species. (Wildlife Biology, Herpetology, Animal Ecology)

Regional Bird Survey – Survey the species present during both migration and non-migration times. Determine and document the habitat utilization as well as susceptibility to disturbance. (Ornithology, Avian Ecology)

Plant Productivity Studies – Establish the productivity of selected plant species and habitats within this ungrazed park, and compare with other parks that allow grazing. (Botany, Plant Ecology, Range Science)

SOCIAL SCIENCE RESEARCH NEEDS:

Outdoor Recreational Vehicle (ORV) Impacts on Visitor Experience – Document the impacts of ORV use on the quality of other visitors' experiences, and make recommendations for management. (Sociology, Recreation Management)

CULTURAL RESOURCE RESEARCH NEEDS:

Archaeological Excavation – Emergency salvage mitigation of 42WN1006, a highly significant rock shelter capable of addressing important research questions about prehistoric subsistence settlement patterns, environmental adaptations, the origins of Anasazi culture, evolutionary change, and cultural affiliation during the late Archaic/Anasazi transition. This research would contribute immensely to understanding the archaeology of the Canyonlands region. Unfortunately, the site is in imminent danger of being destroyed by arroyo cutting. (Archaeology)

Rock Art Conservation – Determine the impacts, both natural and human, occurring at rock art sites and develop specific strategies for performing the necessary conservation work. (Archaeology)

Museum Collection Management – Inventory and compile a complete catalog of the cultural collections. (Museology)

Cultural Resource Base Map – Prepare a map delineating all cultural resource inventories and tie it into the existing report numbering system. (History)

WHO TO CONTACT:

Natural Resources:

Chief, Division of Resource Management
or Natural Resource Management Specialist
Canyonlands National Park
125 W. 200 S.
Moab, UT 84532
(801) 259-7164

Cultural Resources:

Archaeologist
Canyonlands National Parks
125 W. 200 S.
Moab, UT 84532
(801) 259-7164



Capitol Reef National Park

PARK DESCRIPTION

Capitol Reef National Park, with 291,000 acres in south central Utah, was established to protect a unique geological feature known as the Waterpocket Fold – a north-south trending, mostly sandstone, layered escarpment that extends 70 miles from the southern Pinyon and Sandia mountains to Lake Powell. Wind and water erosion has resulted in the creation of numerous cliffs, spires, and canyons along the escarpment offering breathtaking views from the many vista points. Numerous drainage areas of various sizes begin on the high plateau east of the park and flow easterly through the reef eventually entering Lake Powell. There is abundant evidence of prehistoric occupation within the park.

NATURAL RESOURCE SOCIAL SCIENCE RESEARCH NEEDS

Small Mammal Populations – Survey the habitat to determine the small mammal species diversity and abundance. With the use of the park Geographical Information System, describe the habitat in sufficient detail (i.e. elevation, vegetation type, etc.) to determine potential habitat. Prepare a field guide to mammals. (Mammalogy, Wildlife Biology, Interpretation)

Vascular Plant – Survey the park and describe the vascular plant diversity and abundance. (Botany, Plant Ecology, Plant Geography)

Herpetofauna Populations – Survey selected park habitat and determine the reptile and amphibian species diversity and abundance. Describe the habitat in sufficient detail to that potential populations in other unsurveyed areas can be identified. Prepare a herpetofaunal field guide. (Herpetology, Interpretation)

Avian Fauna – Survey the habitat to determine the avian species diversity and abundance. Prepare a field guide to park birds. (Ornithology, Interpretation)

Historical Plant Communities – Sample park old meadows and determine how the grasslands and shrubs have changed since European settlement. (Paleoecology)

Orchard Pests – Study the insect and disease pests in the orchards and prepare an Integrated Pest Management Plan to minimize chemical use. (Entomology, Integrated Pest Management)

Unstocked Grazing – Survey visitor perceptions about livestock grazing in the rangelands. (Ecology, Range Science)

CULTURAL RESOURCE RESEARCH NEEDS

Historic Resources – Prepare a historic review of (1) the settlement of Fruita; (2) Cathedral Valley cattle industry; (3) Cyclist Union Mine and other mining activity; (4) Pinedale and Sleeping Ute Indian Reservations; (5) Old Capitol (large wagon road construction project); (6) Hole Crossing pioneer trail; (7) Gifford's Cabin and (8) the Burr Trail. (History)

Archaeological Survey – Survey selected areas such as the Pleasant Creek drainage, Oak Creek drainage and the headquarters area. Evaluate the identified sites for eligibility to the National Register of Historic Places. (Archaeology)

Contexts of Significance – Prepare the preliminary preliminary contexts of significance that will be used in evaluating cultural properties for the National Register of Historic Places. This work can be done as part of other projects. (History)

Museum Collection - Prepare an inventory and guide for preserving park museum collections (i.e., archeological artifacts, historic artifacts, and herbarium). (Museology)

WHO TO CONTACT:

Resource Management Specialist
Capitol Reef National Park
Torrey, UT 84778
(801) 425-3791



Cedar Breaks National Monument

PARK DESCRIPTION:

Cedar Breaks National Monument was established in 1933 to protect the spectacular cliffs, canyons, and other features with scenic, scientific, and educational values along the west edge of the Markagunt Plateau in southwestern Utah. The 6,155-acre monument contains an outstanding scenic multicolored amphitheater that eroded from the Cedar Breaks (Wasatch formation limestone) at the Ashdown Creek headwaters. The amphitheater (about 75% of the monument) has cliffs, canyons, spires, and arches carved into soft bedrock. The area's vegetation is sparse, with bristlecone pine scattered across the slopes and ridges. There are no trails into the monument area below the rim, and its wilderness character is largely unimpacted because few people venture into the breaks. The rim area is heavily visited. At over 10,000 feet elevation, the rim is a mixture of spruce/fir forest and subalpine meadows. Extensive wildflower displays are common during the summer. Prehistoric human activity is evidenced by surface scatter of artifacts from temporary camp sites. Some subsurface archaeological evidence indicates that people were in the Cedar Breaks area 10,000 years ago.

NATURAL RESOURCE RESEARCH NEEDS:

Natural Areas - Survey the baseline flora and fauna conditions in the lower "breaks." Fewer than 10 persons per year venture into this area, leaving it in virtually pristine condition. (Ecology, Botany, Plant Taxonomy, Ornithology, Mammalogy)

Geology - Develop a geologic map, measure current erosion rates, and document active ongoing geologic processes. (Geology, Geomorphology)

Stratigraphy - Determine depositional environments of the various members of the Cedar Breaks forma-

tion and resolve the nomenclature issue of the Wasatch formation vs. the Cedar Breaks formation vs. the Claron formation. (Geology, Stratigraphy)

Pond/Bog Ecology - Survey the pond/bog environments in the rim area to document the ecological processes, flora and fauna populations, and the effects of exotic brook trout in Alpine Pond. (Ecology, Aquatic Ecology, Botany, Fishery Biology, Wildlife Biology)

Fire - Study past fire occurrence in the monument and surrounding areas. Determine the current fuel loading and fire danger information that will be used in the preparation of a fire management plan for the monument. (Fire Ecology)

Exotic Plants - Map the exotic plants distribution and determine the effects on the endemic plant communities. Recommend strategies for removal of exotic species where possible. (Botany, Plant Ecology, Pest Management)

Forest Insects and Diseases - Identify the current levels of forest insect and disease infestations to assess the forest conditions and to make recommendations for forest management. (Plant Pathology, Forestry, Insect Ecology)

Bristlecone Pine - Determine human impacts on bristlecone pine with particular attention to soil compaction and its effect on standing trees and seedling survival. (Plant Ecology)

Pikas - Study the occurrence and population dynamics of pikas in and around the monument and assess the local subspecies with reference to possible threatened and endangered status. (Wildlife Biology, Mammalogy)

SOCIAL SCIENCE RESEARCH NEEDS:

Visitor Use -- Conduct a visitor use survey to determine the current levels of use throughout the monument, length of visits, visitor activities, etc. (Statistics, Sociology)

CULTURAL RESOURCE RESEARCH NEEDS:

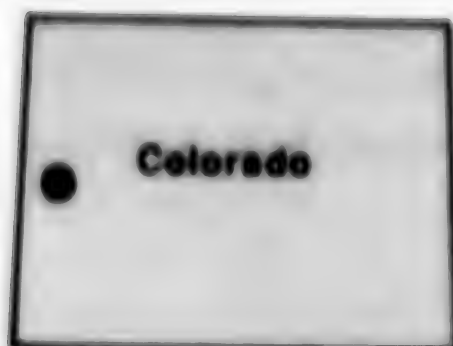
Archaeological Survey -- Survey, document, and map all archaeological sites in the monument. (Archaeology)

Area History -- Prepare a history of human activity in the Cedar Breaks area during the historic period. (History)

Administrative History -- Prepare an administrative history of the monument including both United States Forest Service and National Park Service administrations. (History)

WHO TO CONTACT:

Superintendent
or Chief Ranger
Cedar Breaks National Monument
P.O. Box 748
Cedar City, UT 84720
(801) 586-9451



Colorado National Monument

PARK DESCRIPTION

Colorado National Monument was established in 1911 to protect the outstanding geologic formations found there. The 20,000-acre monument is on the northeastern edge of the Uncompahgre Plateau in eastern Colorado. Elevations range from 4,100 to 7,100 feet and annual precipitation is 11 inches. The park environs are typical of the Colorado Plateau red-rock country. The monument is divided by three major canyon drainage areas containing large sandstone monoliths. Pinyon-juniper forest is the dominant vegetation at lower elevations. The monument contains evidence of prehistoric and historic occupants, and historic sites dating from settlement, ranching, and the Civilian Conservation Corps era.

NATURAL RESOURCE RESEARCH NEEDS

Nonvascular Plants - Survey nonvascular flora and microflora to develop a species list, identify critical habitats and rare species, and work toward their management and protection. (Botany, Microbiology, Plant Taxonomy)

Mammals - Study the distribution, population status, and habitat requirements for park mammals. The study could range from single species to all park species. (Wildlife Biology, Biogeography)

Nesting Raptors - Survey the nesting sites and determine the range and habitat for nesting raptors including golden eagles, red-tailed hawks, and great-horned owls. (Ornithology)

Reptiles and Amphibians - Identify the distribution, population status, and habitat requirements for reptile and amphibian species. (Herpetology)

Limnology - Study the limnological resources of the monument, inventory the aquatic resources, identify and sample water sources, and identify the current and potential impacts to surface water environments and life systems. (Limnology, Hydrology)

Water Quality - Survey the major park drainage areas to quantify existing water quality. Place special emphasis on backcountry use and water quality impacts. (Hydrology, Chemistry)

Special Insects - Determine the species, life history, and distribution of the tating midge (genus *Laelocnipe*). (Entomology)

Fire - Determine the natural role of fire in the Colorado National Monument ecosystem. This should include describing the monument's fire history, fuel loading, fire weather, and areas of special concern. (Fire Ecology)

CULTURAL RESOURCE RESEARCH NEEDS

Historic Resources - Prepare maps to identify the historical resources and land uses. (History)

Museum Collection - Inventory and compile a catalog of the monument's museum collection. (Museology)

Archaeologic Survey of Select Areas - Conduct a systematic archaeological survey of selected areas of the monument and evaluate them for the National Register of Historic Places. Selected areas include Rio Huerfano Canyon, the headquarters area, the east entrance, and specific drainage areas. (Archaeology)

Contexts of Significance - Develop prehistoric and historic contexts of significance for the park and

nominate the remains that meet criteria of the National Register of Historic Places. (History, Archeology)

WHO TO CONTACT:

Natural Resources:

Resource Management Specialist
Colorado National Monument
Fruita, CO 81581
(303) 856-8617

Cultural Resources:

Chief Ranger
Colorado National Monument
Fruita, CO 81581
(303) 856-3617



Curecanti National Recreation Area

PARK DESCRIPTION

Curecanti National Recreation Area was established in 1966 as a cooperative project between the Bureau of Reclamation and the National Park Service. The park encompasses three reservoirs on the Gunnison River with a wide variety of surrounding environment including deep canyons, broad mesas, spruce, fir, pine, and cottonwood woodlands, as well as riparian and high desert sagebrush habitats. The area has numerous faunal groups, vegetative types, and varied geologic formations. There are many prehistoric sites and some historic sites evidencing settlement and early railroad activities.

NATURAL RESOURCE RESEARCH NEEDS

Flora - Survey and map the area's flora to provide a list of all of the species found, and make additions to the herbarium collection. (Botany, Plant Taxonomy)

Endangered, Threatened, and Exotic Flora - Survey and map endangered and threatened species that may be present, and identify exotic species and their distribution. (Botany, Plant Taxonomy)

Aquatic Invertebrates - Collect, identify, and list all aquatic invertebrate species, including the population levels in several major tributaries, to develop an index for evaluating fisheries management. (Microbiology, Invertebrate Zoology, Entomology, Aquatic Ecology)

Heavy Metals in Fish - Collect trout, salmon, and other fish species and analyze tissues for heavy metal content. Then compare the results with those from previous investigations. (Fishery Biology, Aquatic Ecology, Chemistry)

Great Stomach (Pteronarcys californica) Rehabilitation - Research the stomach habitat requirements, identify the potential rehabilitation areas. (Entomology, Aquatic Ecology)

Bubonic Plague Bacillus and Prairie Dog Density - Review literature and case studies in other areas in the country to determine if correlation exists between plague outbreaks and population densities of carriers, especially prairie dogs. (Microbiology, Wildlife Biology, Public Health, Pathology)

Fire - Research area fire history, look at previously burned areas and determine regeneration of desirable vegetation for ungulate use. (Wildlife Biology, Botany, Fire Ecology)

Peregrine Falcon and Other Raptors - Survey for possible raptor nesting sites for endangered peregrine falcons. Determine the distribution of golden eagles, owls, and other area raptors. (Ornithology)

Small Mammal - Conduct a baseline study of species distributions and relative population numbers of mice, voles, shrews, squirrels, etc. (Wildlife Biology, Mammalogy)

CULTURAL RESOURCE RESEARCH NEEDS

Archaeological Sites Below High Water Line - Survey and map the archaeological sites along the shoreline of the Blue Mesa Reservoir during draw-down periods (spring and fall) to determine wave action damage during water level changes. (Archaeology)

Administrative History - Research the origins of the Curecanti project, land exchange dates, construction project dates, names of staff members, ad-

mitigation dates, and other relative information.
(History)

Museum Collection -- Prepare an inventory and
catalog of the area's cultural collection. (Museology)

WHO TO CONTACT:

Natural Resources:

Resource Management Specialist
Cusick National Recreation Area
107 Elk Creek
Gunnison CO 81230
(303) 641-2337

Cultural Resources:

Chief Ranger
Cusick National Recreation Area
107 Elk Creek
Gunnison CO 81230
(303) 641-2337



Custer Battlefield National Monument

PARK DESCRIPTION:

The events of June 25 and 26, 1876, forever etched the names Little Big Horn, Custer, and Sitting Bull into the American mind. By 1870, the battlefield was declared a national cemetery and in 1926, Reno-Bentzen Battlefield was added. In 1940, the area was transferred to the National Park Service and in 1946, the designation changed from National Cemetery to National Monument. Today, Custer Battlefield National Monument encompasses 765.34 acres; a portion is administered as the Custer Battlefield National Cemetery with more than 4,300 gravesites.

NATURAL RESOURCE RESEARCH NEEDS:

Trails – Prepare a map showing the present in-park trail systems in relation to existing and historic topographic and cultural features. (Geography, Archeology, History)

Deep Ravine Trail – Prepare a comprehensive study of the impact of visitor use on the Deep Ravine Trail system and develop suggestions to mitigate existing damage. (Natural Resource Management)

SOCIAL SCIENCE RESEARCH NEEDS:

Visitor Length of Stay – Conduct study to determine current monument visitor's length-of-stay and its impact on existing parking problems. (Park Management, Statistics)

Visitor Interest – Determine visitor interests in existing or potential programs. (Sociology, Outdoor Recreation)

Native American Perception – Research Native American perceptions of the Battle of the Little Big

Horn and the Custer "image," and its effect on their use or non-use of the monument. (Sociology, History)

Visitor Demographics – Survey current visitor demographics including point of origin, family size, age, special populations, and means of transportation. (Sociology)

CULTURAL RESOURCE RESEARCH NEEDS:

Museum Collection Management – Place museum records (i.e., accession and catalog cards) onto computer-based system. (Museology)

Indian Participants – Prepare brief biographies of the leading Indian participants in the Battle of the Little Big Horn. (History)

Historic Photographs – Update the park's historic photograph register. (History)

7th Cavalry List – Prepare an alphabetical listing of all individuals enlisted in the 7th Cavalry from 1866 to 1891. The list would include all the vital statistics noted on muster rolls such as height, weight, and place of birth. (History)

Collections – Transcribe the correspondence collection into typescript. (History)

Fort Custer Relationship – Prepare a history of the relationship between Fort Custer and the Custer Battlefield National Cemetery. (History)

Historic Trails – Prepare a historic trail study detailing the route of the 7th Cavalry from Rosebud Creek to the battlefield. Include all related sites along the

route including campsites (Indian and military), and the Sitting Bull vision site. (History)

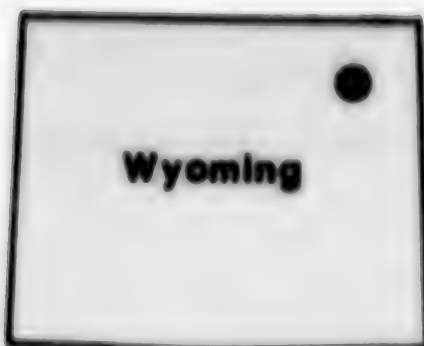
Trail Brochure -- Develop a self-guiding trail brochure for the national cemetery including a history of the cemetery, its relationship with other frontier military forts, the location of historic or interesting gravesites, information on the administration of the cemetery, and current burial activity. (History, Interpretation)

History Bibliography -- Investigate records in the National Archives, and/or other national repositories, to determine if untapped historic resources are available. Prepare a bibliography of new sources and material located. (History)

Bureau of Indian Affairs (BIA) Relationship -- Study of the relationship between the BIA and the national cemetery/national monument. (History)

WHO TO CONTACT:

Superintendent or
Chief Historian
Custer Battlefield National Monument
Box 39
Crow Agency, MT 59022
(406) 638-2622



Devils Tower National Monument

PARK DESCRIPTION:

Devils Tower is a massive plug of once molten rock, the largest of its kind in the United States, that rises abruptly from the surrounding grasslands into one of the most conspicuous geologic features of the Black Hills region. To preserve its scenic beauty and scientific interest, in 1906 President Theodore Roosevelt established Devils Tower and a small surrounding area as the first national monument. Devils Tower National Monument covers an area more than 2 square miles near the center of Crook County in northeastern Wyoming.

NATURAL RESOURCE RESEARCH NEEDS:

Water Quality -- Evaluate water quality in the Belle Fourche River. Place special emphasis on toxicity especially caused by ranchers using chemical spray applied by hand and aircraft, etc. Ascertain the effects on aquatic life and the probable source of the toxic chemical, if any. Spring, summer, and fall testing may be required. (Chemistry, Toxicology, Aquatic Ecology)

CULTURAL RESOURCE RESEARCH NEEDS:

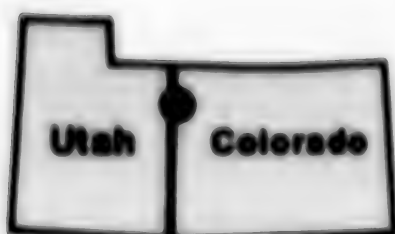
Archaeological Research -- Prepare a detailed archaeological research design and develop archaeological contexts-of-significance. Evaluate documented sites for eligibility to the National Register of Historic Places. (Archaeology)

Special History -- Conduct library research in Wyoming (i.e., University of Wyoming, Wyoming State Archives, etc.) on Devils Tower National Monument and the surrounding area to add to the database. (History)

Devils Tower History -- Conduct library research outside of Wyoming (i.e., Library of Congress and National Archives) on Devils Tower National Monument and surrounding area to add to the database. (History)

WHO TO CONTACT:

Superintendent or
Chief of Interpretation and Resource Management
Devils Tower National Monument
Devils Tower, WY 82714
(307) 467-5370



Dinosaur National Monument

PARK DESCRIPTION:

Dinosaur National Monument was established in 1915 to protect the unique fossil resources at the Dinosaur Quarry. The monument was expanded in 1938 to more than 211,000 acres to include the canyons of the Green and Yampa Rivers. The monument preserves the most productive Jurassic Period quarry in the world. The monument also has the most complete stratigraphic record of any area in the National Park System. The Yampa River is the last major free-flowing tributary in the Colorado River system. The canyons, mountains, and semiarid uplands of the monument provide habitats for several endangered species, a wide variety of wildlife, and unique assemblages of sensitive endemic plants. The monument may have been a cultural dividing and mixing zone for the Great Basin, plains, and southwest aboriginal cultures. Its archeological past extends back beyond 9,000 years.

NATURAL RESOURCE/SOCIAL SCIENCE RESEARCH NEEDS:

Grazing Impacts -- Study the impacts of domestic grazing livestock (permitted pursuant to Public Law 86-789) on natural vegetation communities, wildlife population distribution and abundance, archeologic and historic resources, soil characteristics (including cryptogamic communities), paleontological resources, and recreation values. (Wildlife Biology, Botany, Archeology, Recreation Management, Paleontology, Soil Science, Ecology)

River Scenes -- Research the relationship between natural Yampa River flows (and their times of occurrence) and the scenic canyon river resources. Assess the potential impacts of upstream water developments on aesthetic values. (Hydrology, Recreation Management)

Riparian Vegetation -- Study native and non-native riparian vegetation establishment and maintenance in the river canyons. (Plant Ecology, Hydrology)

Air Quality -- Identify the impacts of air pollution and acid deposition on sensitive biological, cultural, and/or paleontological resources. (Meteorology, Biology, Archeology, Paleontology, Atmospheric Science)

Nonvascular Plants -- Survey nonvascular flora to determine species diversity, abundance, and sensitivity. (Botany, Plant Taxonomy)

Exotic Plants -- Determine exotic plant distribution and abundance. Assess the impact of exotic plants on natural vegetation communities. (Botany, Plant Ecology)

River Use -- Research the impacts of pit toilets on riparian systems and identify the impacts of alternative waste disposal methods. (Natural Resource Management, Recreation Management)

Bighorn Sheep -- Study the genetic variation between the two distinct bighorn sheep populations in the monument. The study could be expanded to incorporate two other populations adjacent to the monument. (Wildlife Biology, Genetics)

Bighorn Sheep -- Study the population energetics of the lower elevation bighorn sheep. (Wildlife Biology, Population Biology)

Elk -- Research elk distribution, movements, and range-use in and adjacent to the monument to assist management of interagency elk herds. (Wildlife Biology)

Spotted Bat -- Study the status, distribution, and habitat use of spotted bats. (Mammalogy, Wildlife Biology)

Reptiles and Amphibians -- Determine the status, distribution, and habitat selection of reptiles and amphibians. (Herpetology)

Aquatic Macroinvertebrates -- Study the species status, distribution, and abundance of aquatic macroinvertebrates in the Green and Yampa Rivers and tributaries. (Entomology, Aquatic Ecology)

Endangered Fish/Fishing Impact -- Determine the impacts of recreational angling on Colorado squawfish, humpback chub, and razorback sucker populations in and adjacent to the monument. (Fishery Biology, Ecology)

Water Resources -- Inventory and characterize the monument's groundwater resources. (Hydrology)

Nesting Raptors/Peregrine Conflicts -- Identify golden eagle, prairie falcon, goshawk, red-tailed hawk, and great-horned owl nesting sites to reduce conflicts with the recovery program of the endangered peregrine falcon. (Ornithology)

Paleontologic Resources -- Survey geologic exposures for fossil vertebrate, invertebrate, and paleobotanical resources; plot the localities on aerial photographs; prepare site sheets for each locality; and photograph each locality. Separate surveys are needed for each of the following: Morrison Formation, Moenkopi and Chinle Formations, Navajo and Curtis Formations, and Frontier Formation. (Paleontology, Geology)

Mesozoic Microvertebrates -- Study the sedimentary and depositional features of selected Mesozoic formations in the monument to identify areas with a high potential for producing microinvertebrate remains. (Paleontology, Stratigraphy, Geology)

Excavation of Cedar Mountain Formation Dinosaur Quarry -- Reopen a dinosaur quarry located in the Lower Cretaceous Cedar Mountain Formation. Excavate and map remaining fossils, identify, and correlate with other Lower Cretaceous fossil vertebrate localities in the United States. (Paleontology)

Geological Bibliography of Periods of the Mesozoic Era -- Prepare a geologic and paleologic bibliography for each period of the Mesozoic Era: Triassic, Jurassic, and Cretaceous. Include exposures of these formations both in and outside of Dinosaur National Monument. (Geology, Stratigraphy, Paleontology)

Quarry Stress Evaluation -- Design a stress monitoring system to evaluate stability and cracking in the main monument quarry. This quarry is 50 by 150 feet and is a permanent exhibit with over 8,000 dinosaur bones preserved *in situ*. Stability is threatened by isostatic rebound due to the removal of some 80 feet of overburden over the last 80 years. (Paleontology, Geology, Engineering)

CULTURAL RESOURCE RESEARCH NEEDS:

Archeological Survey -- Locate, map, describe, and evaluate the significance of archeological sites in monument areas that have not been surveyed. (Archeology)

Administrative History -- Compile the park's administrative history from 1915 to the present. (History)

Josie Morris Bassett -- Research the life of Josie Morris Bassett and complete an objective written report. (History)

Rial Chew -- Research the life of Rial Chew and family and complete a written history of their life at the Pool Creek Ranch. (History)

Petroglyph Monitoring -- Establish a program to inventory, document, and monitor rock art in the monument. (Art Preservation)

Contexts-of-Significance -- Develop prehistoric and historic contexts-of-significance and prepare the National Register of Historic Places nomination forms for all eligible resources. (History, Archeology)

Museum Collection -- Update curatorial records to comply with new National Park Service procedures, and assist in the reorganization of the museum collections. (Museology, Paleontology)

WHO TO CONTACT:

Natural Resources

Resource Management Specialist or
Chief of Interpretation
Dinosaur National Monument
P.O. Box 810
Dinosaur, CO 81610
(303) 374-2216

Paleontologist
Dinosaur National Monument
P.O. Box 128
Jensen, UT 84035
(801) 789-2115

Cultural Resources

Chief of Interpretation
Dinosaur National Monument
P.O. Box 810
Dinosaur, CO 81610
(303) 374-2216

Paleontologist
Dinosaur National Monument
P.O. Box 128
Jensen, UT 84035
(801) 789-2115



Florissant Fossil Beds National Monument

PARK DESCRIPTION

The Oligocene labeled shales of Florissant, unique in origin, preserve more species of terrestrial fossils than any other known site in the world. The insect fossils are of primary significance. They represent the evolution and modernization of insects faster than any other known site in America. The fossil plants, emphasized dramatically by the petrified tree stumps and the great variety of leaf fossils, add greatly to the primary values. Fossils of spiders, other invertebrates, fish, and birds have also been found. The 5,000-acre monument was established by Congress in 1969. It is located in a depression within the Rocky Mountain Foreplain which flares from the west. Elevations range from 6,200 to 8,000 feet. The fir and pine covered hills and the grassy meadows are typical of the Montane Life Zone.

NATURAL RESOURCE RESEARCH NEEDS

Paleontology - Develop a paleontology research plan. Include collecting guidelines. Obtain input from paleontologists who have worked with the area's fossil resources. The plan will require National Park Service approval before it is adopted. (Paleontology)

Museum Collections - Prepare a collection management plan for the monument's collection. (Museology)

Museum Collections - Provide an adequate museum storage structure for the monument's collection. (Museology)

Collections - Provide an inventory of all fossil collections originating from the Florissant fossil beds. Compile the catalogs of all collections for reference and use at the monument. (Museology)

Aerial Photography - Provide large scale coverage of the Florissant Basin in color infrared and/or black and white photography. (Photography)

Vegetation - Prepare a vegetation/soil community map patterned on the hierarchical system of Braun, Lieke, and Peck, 1979. A regional classification system by the local communities of North America, with community (soil) and association examples for the Southwest. *Journal of the Arizona Nevada Academy of Science* 16 (Supp. 1): 1-16. (Botany, Plant Ecology)

Vegetation - Establish long term vegetation transects in the various plant communities and habitat types. (Botany, Plant Ecology)

Bibliography - Compile an annotated bibliography of all scientific publications related to the monument and its natural resources, particularly the paleontology and geology. The product should be in a computerized form compatible with park equipment. (Biology, Geology, Paleontology, Computer Science)

Nonvascular Plants - Survey the nonvascular flora, develop a species list, and identify habitats and rare species. Provide a collection of species. (Botany, Plant Ecology, Plant Taxonomy)

Elk Habitat - Map habitat types used by Florissant elk over their total range. Establish transects and enclosures in the monument to monitor habitat trends. Elk distribution and travel patterns are currently being studied. (Wildlife Biology)

Deer Medicine - Conduct a literature search on deer medicine and provide an annotated bibliography. (Botany)

Dwarf Mistletoe - Map dwarf mistletoe infestation within the monument. (Botany, Pest Management)

Fire - Determine the fire history and fuel loadings. (Fire Ecology)

Water Resources - Complete the inventory of monument surface and subsurface waters. Study the relationship between surface and subsurface waters. Determine the water quality parameters. Establish a long-term monitoring program. (Hydrology)

Raptors - Survey and map raptor nesting sites. Use Universal Transverse Mercator (UTM) (metric grid) coordinates. (Ornithology)

Birds - Conduct a baseline breeding birds inventory. Establish appropriate bird transects in the various habitat types. (Ornithology, Avian Ecology)

Insects - Complete the park's collection. Collect, classify, catalog, prepare for museum storage, and write a checklist for monument insects. (Entomology, Invertebrate Taxonomy)

Porcupines - Conduct a literature search on porcupines and provide an annotated bibliography. (Wildlife Biology, Mammalogy)

Porcupines - Study porcupine/vegetation dynamics and monitor the population/habitat balance. (Animal Ecology, Wildlife Biology)

Albert Squirrels - Conduct a literature search on Albert Squirrels and provide an annotated bibliography. (Wildlife Biology, Mammalogy)

Albert Squirrel - Study squirrel/vegetation dynamics and monitor the population/habitat balance. (Animal Ecology, Wildlife Biology)

SOCIAL SCIENCE RESEARCH NEEDS:

Visitor Mapping - Conduct a visitor use survey to determine the current levels and locations of park use, length of stay, activities, unfulfilled expectations, etc. (Sociology, Statistics)

CULTURAL RESOURCE RESEARCH NEEDS:

Administrative History - Compile the monument's

administrative history. Include proposals for national park status prior to its establishment in 1908. (History)

Land Use History - Compile the history of land ownership and related land uses from the first homestead up to the present for the lands within the monument. As a second phase, expand the study to include the lands in the surrounding Grape Creek watershed which cradles the monument. (History)

Adeline Hombek - Research the life of Adeline Hombek and her family and complete a written history. Trace the ancestors and descendants. (History)

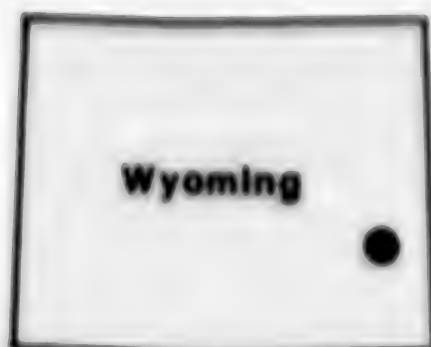
Historic Archeology - Relocate fossil quarries and record Universal Transverse Mercator (UTM) coordinates for each site. (Archeology)

Archeology - Complete the archeological survey of the monument. About 80 percent of the monument has been intensively surveyed. (Archeology)

Aboriginal Tree Scars - Inventory and map the scarred ponderosa pines using Universal Transverse Mercator (UTM) coordinates. There are a substantial number of ponderosa pines which have had patches of cambium removed. The trees are similar to other documented cases of aboriginal tree use. Provide written and photographic documentation of each tree. Include age determination through core sampling. (Forestry, Anthropology)

WHO TO CONTACT:

Superintendent
Florissant Fossil Beds National Monument
P.O. Box 185
Florissant, CO 80816
(718) 748-3253 or 748-3051



Fort Laramie National Historic Site

PARK DESCRIPTION:

A fur trading post (Fort William) once stood on the park property, but the surviving buildings are those of Fort Laramie, a major military post that guarded covered wagon trails to the West. This post served as a focal point during the Indian Wars period. It was deactivated in 1890. The site of the military post was designated as a national monument on July 16, 1938, and as a national historic site on April 29, 1960. The site consists of more than 800 acres, most of which are federally owned.

NATURAL RESOURCE RESEARCH NEEDS:

Underground Water Resources – Conduct a subsurface hydrologic survey that relates to water needs of the Fort Laramie National Historic Site. (Hydrology)

Historic Wildlife – Inventory the wildlife in the Fort Laramie area from 1834-1890 describing the effects of immigration, settlement, and fur trade on the distribution and populations of elk, bear, wolf, and bison. (Wildlife Biology, Biogeography, Anthropology, History)

CULTURAL RESOURCE RESEARCH NEEDS:

Archaeological Base Map – Develop a comprehensive archaeological base map from written data and physical inspection. (This project could be broken down into the following segments: (1) immediate fort area of approximately 20 acres, (2) adjacent area of approximately 100 acres, (3) Oregon Trail area of 100 acres, and (4) remaining acreage of approximately 600 acres.) (Archaeology)

Museum Collection – Update curatorial records to comply with new National Park Service procedures.

This project is approximately 50 percent complete (Museology)

Fort William – Locate the first Fort Laramie (Fort William) including the analysis of the various primary sources and theories as to its location. (Archaeology, History)

Historic Furnishings – Prepare furnishings studies for the commissary storehouse and magazine, and most of the downstairs rooms in the south wing of the 1874 cavalry barracks. (History)

Indian Treaty Sites – Conduct a comprehensive study of the Indian treaty sites at Fort Laramie and the nearby vicinity, including information about the participants, probable location of treaty sites, text of the treaties, events that occurred during the treaty councils, the result that the treaties had on Indian-white relations, and the final subjugation of the Indian people. (History)

Medical Corps – Study United States Army Medical Corps procedures, facilities (including convalescent) and personnel at Fort Laramie. (History)

Bibliography – Develop a bibliography for Fort Laramie including its role on the Oregon, Mormon, Bozeman, and California trails. (History)

Quartermaster Department – Prepare a study of the quartermaster department including its operation, facilities, logistical problems, and personalities as they related to the frontier army in general, and to Fort Laramie in particular. (History)

Homesteading – Study the homesteading period at Fort Laramie from 1891-1927. (History)

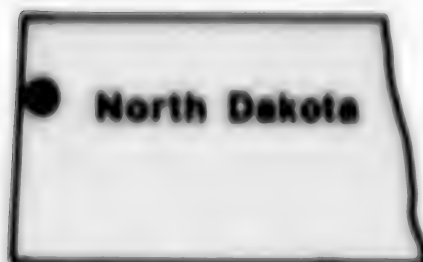
3 Mile Ranch -- Study 3 Mile Ranch at Fort Laramie
(History)

Commanding Officers -- Research and write
biographies of all commanding officers of Fort
Laramie, 1849-1890 (History)

Cultural Landscape -- Identify lands immediately
visible from the grounds around the historic buildings
that are crucial to maintaining the historic scene.
(History, Geography)

WHO TO CONTACT:

Chief of Visitor Services and
Resource Management
Fort Laramie National Historic Site
Fort Laramie, WY 82210
(307) 837-2221



Fort Union Trading Post National Historic Site

PARK DESCRIPTION:

Established in 1809 by the American Fur Company, Fort Union Trading Post was the most important American fur trading site on the Upper Missouri River. It had a vital impact on exploration, frontier transportation, economics, and the Northern Plains Indian culture. Sold to the United States Army in 1807 as a source of building materials, Fort Union was quickly dismantled. The 434-acre National Historic Site was established in 1964, and the fort is undergoing partial reconstruction.

NATURAL RESOURCE RESEARCH NEEDS:

Native Vegetation Management – Develop a plan to restore and manage the mid-grass prairie and riparian bottoms, recognizing fire as a critical tool. (Botany, Range Science, Fire Ecology, Restoration Ecology)

CULTURAL RESOURCE RESEARCH NEEDS:

Collections – Catalog and arrange the Fort Union Trading Post artifact collection, and create a plan for permanent preservation. (Museology)

Missouri River Boats – Identify and describe the many distinctive boats common on the Upper Missouri River including bullboats, keelboats, flatboats, Mackinaws, ferries, and steamboats. (History)

Frontier Construction – Identify and describe the craft skills and tools essential to the construction and maintenance of an elaborate fur trading post like Fort Union. (History)

Geologic Exploration – Study the relationship between Fort Union and the geological exploration of the Williston Basin and the Northern Plains. (History)

Archaeology – Locate, evaluate, and map the secondary archaeological resources including the gardens, well, barn, landing, Fort William, Mondak, Java, Laperleur's post, Gregory-Geoway post, and the Crow Flies High Village. (Archaeology)

Historic Furnishings – Study the historical furnishings of the northwest and southwest bastions, the trade house, and the Bourgeois House. (History)

Collections – Catalog the in park fur trade and history manuscript collections. (Museology)

Trading Post Employees – Study the employee life styles at Fort Union Trading Post, noting particularly social hierarchies, family relationships, and material factors. (History)

Biographies – Develop biographical sketches of the Fort Union bourgeois and chief clerks. (History)

Native American Tribes – Research the interrelationships between Native American tribes and Fort Union. (History, Anthropology)

Military History – Study the military legacy of Fort Union including related exploration, campaigns, occupations, and early Fort Buford associations. (History)

WHO TO CONTACT:

Natural Resources:

Resource Management Specialist
Theodore Roosevelt National Park
P.O. Box 7
Medora, ND 58545
(701) 623-4486

Cultural Resources:

Superintendent
Fort Union Trading Post National Historic Site
Bulford Route
Wilton, ND 58001
(701) 572-8080



Fossil Butte National Monument

PARK DESCRIPTION:

Fossil Butte National Monument was established in 1977 to preserve the outstanding paleontological sites and related geological phenomena. Fish fossils are the primary resource. They represent fresh-water fish evolution better than any other known site in America. In addition, fossil remains of plant and animal life are found in the Wasatch Formation. The 8,198-acre monument also contains a varied flora and fauna. Abrupt changes from dry brushlands and grasslands to forests and a variety of wildlife provide additional dimensions to the monument.

NATURAL RESOURCE RESEARCH NEEDS:

Aquatic Communities - Survey Chicken Creek to collect baseline data on composition of present and historic aquatic communities. (Aquatic Ecology)

Mammal Populations - Develop the baseline population information on large and small mammals within the monument. Survey to include species abundance, distribution, and habitat selection. (Wildlife Biology)

Bird Populations - Identify and gather baseline data on the various bird species occurring in the monument. (Ornithology)

Reptiles and Amphibians - Determine the status, distribution, and habitat selection of reptiles and amphibians. (Herpetology)

Air Quality - Develop baseline air quality data. Determine the effects on park resources of the coal-fired power plant that is located 12 miles downstream. (Meteorology, Botany, Plant Ecology, Hydrology)

Paleontology of the Wasatch Formation - Investigate the recent bluffs for vertebrate remains. (Paleontology)

Plant Community - Collect additional information to establish a long-term successional trend and correlation of the various monument plant communities. (Botany, Plant Ecology)

Water Resources - Determine water sources and evaluate their seasonal availability. Project long-range monument and grazing water requirements as specified by the enabling legislation. (Hydrology)

Paragrine Falcon - Determine the endangered paragrine falcon's use of the park, including nesting, hunting, and roosting sites. (Avian Ecology, Ornithology)

CULTURAL RESOURCE RESEARCH NEEDS:

Historic Sites - Study home and fossil camp sites that date from the 1870s to the 1930s. Prepare maps showing all historic sites. (History)

Archaeological Survey - Conduct an intensive systematic archaeological survey of selected areas. (Archaeology)

WHO TO CONTACT:

Superintendent
Fossil Butte National Monument
P.O. Box 527
Kemmerer, WY 83101
(307) 877-3450



Glacier National Park

PARK DESCRIPTION

Glacier National Park is one of the world's outstanding wilderness parks. It preserves a spectacular mountain landscape, rich flora, and diverse wildlife in a remarkable natural resource complex. Glacier is part of a nearly contiguous group of wilderness areas along the northern Rocky Mountain crest. The park is a unit of the International Biosphere Reserve system, established by the United Nations Educational, Scientific, and Cultural Organization (UNESCO), and it is part of the Glacier-Watkins International Peace Park.

NATURAL RESOURCE RESEARCH NEEDS

Vegetation Dynamics - Document vegetation changes on the park's west side using comparative photographs. (Botany)

Biological Diversity - Survey the invertebrate species to provide a database for protecting biological diversity. (Invertebrate Zoology)

Biogeography Review - Review the biogeography of flora and fauna to identify which species are at or near the limits of their range, and which species might be useful indicators of environmental change. (Biogeography, Ecology, Botany, Zoology)

Amphibians and Reptiles - Document the distribution, population status, and habitat requirements of park amphibians and reptiles. (Herpetology)

Aerial Photography - Provide parkwide aerial photographic coverage in color, infrared or black and white, 8 inch format. The most recent photographs are now 20 years old. (Photography)

Fire History - Prepare a history of fires within Glacier including maps of significant fires. (History, Fire Ecology)

Fire Management History - Prepare a history of National Park Service fire management. (History, Fire Ecology)

Mosses, Lichen, Fungi, and Algae - Provide an inventory and a description of habitat association and distribution for representative species. (Bryology, Botany)

Weather Monitoring - Establish a remote weather monitoring station network to obtain real-time data on localized temperature, precipitation, and solar radiation. (Meteorology)

Digital Elevation Model (DEM) - Develop a parkwide DEM using 7.5 minute quadrangles at the 1:24,000 scale. Existing digital topographic data is relatively general at the 1:250,000 scale. (Computer Science)

Soils Classification - Develop a soils key and map the distribution of soil types based on current soils taxonomy and geologic processes. (Soil Science)

North Fork Data - Organize and tabulate data collected from 1978 to 1984 on four North Fork streams. Include hydrochemical, fishery, and habitat survey data, verify nomenclature, and identify some specimens. (Hydrology, Fishery Biology, Invertebrate Taxonomy, Aquatic Ecology)

Plankton and Benthic Surveys - Conduct plankton and benthic surveys in two to four selected lakes prior to implementing the National Park Service's lake rehabilitation program, which includes removing the introduced fish populations. Data will be used as

a basis for monitoring post-treatment recovery and to characterize lake biota. (Aquatic Ecology, Restoration Ecology, Invertebrate Zoology)

Bald Eagle -- Track the eaglets banded in the Glacier area to determine the survival rates and migratory patterns. Current nest productivity is so low that immediate documentation of survival rates of this endangered species is necessary to predict the stability of Glacier's population. The rate of return will have long-term implications for genetic interchange. (Ornithology, Population Biology, Genetics)

Salmon/Bald Eagle Relationship -- Determine the effect of the decline of the Flathead Lake Kokanee salmon populations on the bald eagle and prey base use by the endangered bald eagle during autumn migration. (Ecology, Avian Ecology)

Grizzly/Army Cutworm Moth Relationship -- Research the distribution, abundance, and life history of army cutworm moths and their food value to the endangered grizzly bear. (Animal Ecology, Wildlife Nutrition)

Grizzly/Black Bear Den -- Survey den distribution and site requirements of the black bear and the endangered grizzly bear. (Wildlife Biology)

Cambium as Bear Food -- Research the use of tree cambium as a bear food including its nutritive value and role in the bear diet, and the species, age, and size of the trees used. (Ecology, Wildlife Nutrition)

SOCIAL SCIENCE RESEARCH NEEDS:

Visitor Demographics -- Conduct a survey to determine visitor demographics. (Sociology)

CULTURAL RESOURCE RESEARCH NEEDS:

Administrative History -- Prepare a comprehensive administrative history of Glacier National Park. (History)

Concessions History -- Prepare a history study for all concessions with special emphasis on use patterns and facility management. (History)

Government Work Projects -- Prepare a history study for government work projects. The study would include personal interviews concentrating on com-

pleted projects and individual impressions of the programs. (History)

Mineral Exploration History -- Prepare an inventory and make an evaluation of all mining sites and other unidentified ruins for eligibility to the National Register of Historic Places. (History)

Homesteading -- Prepare a history of all homesteading activity excluding the north fork of the Flathead River. Include an inventory, evaluation, and nomination of all eligible historic properties to the National Register of Historic Places. (History)

Photo Collection -- Develop a subject catalog for the museum photo collection. (Museology)

Communication History -- Prepare a history of communication techniques and the effects on park management. (History)

Ethnohistory Study -- Prepare an ethnohistory study for concessions involvement with the Blackfoot Indian tribe. (Anthropology)

Historic Preservation -- Prepare historic preservation guides for several historic structures. (Architecture)

Oral Histories -- Prepare oral histories on a variety of subjects. (History)

Collectors -- Prepare a collection management plan for the museum collection. (Museology)

Archaeology -- Undertake an intensive systematic archaeological survey and prepare a site evaluation for eligibility to the National Register of Historic Places in specific areas, such as the Belly River drainage. (Archaeology)

Contexts of Significance -- Finalize the prehistoric and historic contexts of significance using the National Register of Historic Places format, and nominate resources and districts meeting National Register criteria. (History)

WHO TO CONTACT:

Natural Resources:

Chief Scheriel
Glacier National Park
W. Glacier, MT 59036
(406) 886-5441, ext. 320

Cultural Resources:

Chief of Interpretation
Glacier National Park
W. Glacier, MT 59036
(406) 886-5441, ext. 300



Glen Canyon National Recreation Area

Rainbow Bridge National Monument

PARK DESCRIPTION:

Glen Canyon National Recreation Area, comprising 1.2 million acres in Utah and Arizona, was established in 1972 to "provide for public outdoor recreation use and enjoyment of Lake Powell (and adjacent lands) and to preserve the scenic, scientific, and historic features contributing to public enjoyment of the area." The recreation area contains 163,000 acre Lake Powell, sections of the San Juan and Colorado Rivers, and portions of three major tributaries. An exceptionally scenic area of sandstone canyons, high plateaus, and varied cultural history, the unit is visited by over 2.5 million people a year making it a highly significant public resource. Management of the recreation area's resources is complicated by the existence of grazing and mineral leasing, and by fluctuating reservoir levels.

Rainbow Bridge National Monument, a 160-acre tract of land contiguous to Glen Canyon National Recreation Area, was set aside in 1934 to protect the extraordinary natural bridge for scenic and scientific purposes. The monument abuts the boundary of Glen Canyon National Recreation Area at the upper end of Bridge Canyon. Access to the monument is limited and reached either by boat from Lake Powell or by trail from the north or south slopes of Navajo Mountain through the Navajo Reservation. Since the creation of Lake Powell, visitation to the monument has increased significantly, mainly due to boater traffic.

NATURAL RESOURCE/SOCIAL SCIENCE RESEARCH NEEDS:

Survey of Vascular Plants -- Survey the park's vascular flora to verify the occurrence, consolidate the checklist, and assess distribution and ecological variables necessary to protect those species deter-

mined to be rare or subject to impact. (Plant Taxonomy, Botany, Plant Ecology)

Reclamation of Low Elevation Plant Communities -- Document the physical and environmental factors necessary for the reestablishment of native plant communities where the natural setting has been disturbed by man's activities. Within the recreation area, this work should focus on the blackbrush, shadscale, and ricegrass vegetation types. (Plant Ecology, Restoration Ecology)

Vegetative Descriptions of Plant Communities -- Survey the recreation area vegetation using scientific methods to develop detailed descriptions upon which to base long-term community monitoring. (Plant Ecology, Plant Taxonomy)

Threatened/Endangered Plant Survey and Monitoring -- Conduct a parkwide survey documenting the occurrence of rare plants and their habitats to develop a database for future monitoring of sensitive species. (Plant Taxonomy, Plant Ecology)

Human Impact to Hanging Gardens -- Survey the hanging garden communities along the shoreline of Lake Powell and in Escalante Canyon, and document the recreational impact either through loss of habitat or eradication of a species. (Plant Ecology)

Floristic Information Database -- Develop a computer database on the systematics, ecology, distribution, phenology, abundance, and status of the vascular flora of Glen Canyon National Recreation Area. (Botany, Computer Science)

Cryptogamic Soils -- Survey the recreation area and develop experiments that will identify the ecological conditions necessary in the development and

recovery of cryptogamic soils. (Soil Science, Botany)

Population Study of Reintroduced Bighorn Sheep -- Investigate the population dynamics of the reintroduced desert bighorn sheep herd including home ranges, movement, distribution, and reproduction. (Wildlife Biology, Population Biology)

Bighorn Sheep Habitat Evaluation for Reintroduction -- Analyze the historic desert bighorn sheep habitat and evaluate its potential for future reintroduction of the species. (Wildlife Biology)

Wildlife in the Lakeshore Riparian Zone -- Conduct a baseline inventory of birds, mammals, herpetofauna, and insects and put the information on the dBASE III PLUS database management system. (Ornithology, Mammalogy, Herpetology, Entomology, Computer Science)

Lake Powell Breeding Birds -- Conduct a baseline inventory of breeding birds in the lakeshore riparian zone of Lake Powell and put the data on the dBASE III PLUS database management system. (Ornithology, Computer Science)

Livestock Impacts to Archeological Resources -- Investigate the types and severity of livestock impacts to selected archeological resources and recommend mitigation techniques. Include alcove sites, structures, and lithic sites. (Archeology, Cultural Resource Management)

Grazing Water Development -- Identify and evaluate both the direct and indirect impacts to soils, vegetation, avifauna, and mammals from the construction of a livestock watering project from the project location out to a 5-mile radius. If possible, this should be a long-term study beginning just before the construction of a project, and evaluating impacts for 5 or more years after construction. (Biology, Soil Science, Botany, Ornithology, Wildlife Biology)

Grazing Impacts on Soils -- Evaluate Soil Conservation Service soils data for Glen Canyon and quantify the soil loss and erosion from grazing on selected sites with soils identified as easily erodible. (Soil Science)

Wildlife in Rainbow Bridge National Monument -- Conduct a baseline inventory of birds, mammals, and herpetofauna and put the data on the dBASE III PLUS

database management system. (Ornithology, Mammalogy, Herpetology, Computer Science)

Lake Productivity -- Investigate the primary and secondary productivity of Lake Powell including the nutrient circulation, phytoplankton, and zooplankton surveys. Investigate the associated water quality of Lake Powell. (Aquatic Ecology, Limnology)

Landset Cover Type Classification -- Develop cover type classifications and uniform scale base map for Glen Canyon and Rainbow Bridge from thematic mapper data (digital) using ground-truthed methods. (Remote Sensing, Plant Ecology)

Ecological Monitoring -- Develop aerial photography for the entire recreation area (multiband spectral imagery) for long-term ecological monitoring of changes and impacts. (Ecology, Remote Sensing)

Biotic Inventory of Waterpockets -- Provide a baseline inventory of waterpocket (linaja) biota on the lower waterpocket fold. Include nutrient and water chemistry parameters. (Invertebrate Zoology, Aquatic Ecology)

Native Fish of Small Streams -- Inventory the fish species resident in the perennial tributaries of Lake Powell providing statistical data on the population sizes and distribution. Measure the habitat parameters. (Aquatic Ecology, Ichthyology)

Biotic Inventory of Springs and Seeps -- Inventory flora and fauna of hanging gardens and riparian zones fed by springs and seeps in sandstone canyons. Provide the population and distribution data. (Invertebrate Zoology, Plant Taxonomy)

Recreation Impact on Lake Powell -- Quantify recreation impact on shoreline sites, correlating with use levels and including surface damage effects. (Outdoor Recreation, Statistics, Ecology)

Backcountry Use in the Escalante River Canyon -- Investigate the impacts on the Escalante River drainage from backcountry use, correlating with the use levels and estimating effects on the ecological and archeological parameters. (Outdoor Recreation, Ecology, Archeology)

Island Biogeography -- Investigate isolated butte, mesa, or canyon landforms for biogeographical

relationships and Colorado River canyons as species barriers. (Biogeography, Ecology)

Riparian Community Ecology -- Study community structure, species relationships, and hydrology of riparian zones along small streams. (Ecology, Hydrology)

Paleontological Resource Inventory -- Develop a baseline inventory of fossils in the recreation area and their distribution by geologic strata. Provide interpretive information concerning the fossils found. (Paleontology, Interpretation)

Exotic Species Biology and Management -- Study alternative controls and management techniques for the phreatophyte Tamarisk and other species of concern such as Russian Olive. Document the habitat values and conflicts of the plants with recreational use of the area. (Plant Ecology, Integrated Pest Management)

SOCIAL SCIENCE RESEARCH NEEDS:

Economic Evaluation of Lake Powell Recreation -- Conduct a survey of recreation economics on Lake Powell using, for example, contingent valuation methods. (Economics, Outdoor Recreation)

Economic Evaluation of Rafting on the San Juan River -- Conduct a survey of recreation economics on the San Juan River from Sand Island to Clay Hills Crossing. (Economics, Outdoor Recreation)

Economic Evaluation of Backpackers in the Escalante Canyon -- Conduct a survey of recreation economics for backpacking in the Escalante Canyon portion of Glen Canyon National Recreation Area. (Economics, Outdoor Recreation)

Recreation Quality Studies -- Investigate the visitor's perception of recreational quality of Lake Powell correlating with crowding, user activities, and availability of sites. Identify any recreation needs that are within the park's mission but are not being provided for the visitor. Quantify visitor statistics including visitor origin, length of stay, etc. (Outdoor Recreation, Sociology)

Recreation Quality -- Investigate visitor perception of recreational quality on Lake Powell; correlate with

crowding, user activities, and availability of sites. (Outdoor Recreation, Sociology)

Scenic Resources -- Investigate potential classifications for scenic resources and inventory them. (Sociology, Outdoor Recreation, Landscape Architecture)

CULTURAL RESOURCE RESEARCH NEEDS:

Historic Structure Reports -- Prepare comprehensive reports utilizing archival research of activities that took place at Lonely Dell Ranch and Lees Ferry National Register of Historic Districts.

Ethnographic Study -- Prepare an ethnographic study of the early inhabitants of the Lonely Dell Ranch and Lees Ferry National Register Historic Districts using extant data (including typed interviews) and newly collected data from living informant. (History)

Ethnographic Study of Rainbow Bridge National Monument -- Perform an ethnographic study of the prehistoric and historic significance of Rainbow Bridge including religious and ceremonial implications. (Anthropology)

Historic Structure Preservation Guides (HSPGs) -- Prepare HSPGs to guide the monitoring and preservation activities for the 10 to 15 historic structures and features at the Lonely Dell Ranch and Lees Ferry National Register Historic Districts. Guides for monitoring should also contain programs or solutions when problems are detected. (Architecture)

Historic Structure Reports (HSRs) -- Prepare HSRs for one or more of the three prehistoric sites in the park receiving the highest visitation: Defiance House, Widow's Ledge, and Three-Rock Ruin. Study would involve visiting museum collections and assembling records and notes of previous excavations. (History, Museology, Architecture)

Archaeological Survey -- Perform cumulative inventories of any of several high priority sites in the park thought to contain significant and threatened resources. (Archaeology)

Archaeological Test Excavations -- Perform limited salvage excavation at one of several sites damaged by illegal digging. The goal of the excavation would be to assess the extent of damage and determine the

nature of undisturbed cultural deposits. (Archaeology)

Cultural Resource Survey of Development Areas -- Perform intensive surveys of acreage immediately adjacent to the development areas for the purpose of locating significant resources. (Archaeology)

Administrative History -- Prepare a study of the administrative, political, and social events surrounding the formation of the area including the early role of the Bureau of Reclamation, the acquisition of lands for the area, the early archaeological studies, and the pre-floodation resources of Glen Canyon. (History)

Historic Sites -- Prepare comprehensive reports using archival research of activities which took place at the Lonely Dell Ranch and Lees Ferry National Register Historic Districts. (History)

Historic Resources Base Map -- Prepare a detailed map of the Lonely Dell Ranch and Lees Ferry National Register Historic District using intensive surveys. (History)

Contexts of Significance -- Prepare prehistoric and historic contexts of significance that are to be used in evaluating cultural properties for eligibility to the National Register of Historic Places. This project can be broken down into two projects or done as one large project. (Archaeology, History)

WHO TO CONTACT:

Resource Management Specialist or
Regional Chief Scientist
Glen Canyon National Recreation Area
P.O. Box 1507
Page, AZ 89040
(802) 645-2471



Golden Spike National Historic Site

PARK DESCRIPTION:

Golden Spike National Historic Site was established on July 20, 1909, to preserve and commemorate 15.6 miles of original railroad grade and the "Last Spike" site where the nation was first united by rail on May 10, 1869, at Promontory Summit. Park elevations range from 4,220 to 4,980 feet above sea level.

Most of the 2,735-acre park follows a serpentine route along the original 430-foot wide railroad right-of-way. The park also has additional land for administrative purposes and to protect 1880s to 1900s construction sites, worker camp sites, and railroad culverts and trestles.

The area park is surrounded by hillsides, mountains, and plains at the summit of the Promontory Range in the northern part of the Great Basin. Dominant life forms include the shrublands, kangaroo rat, and other species associated with the sagebrush plant community of the Great Basin Desert. Soils were formed from lake deposits and glacial detritus; they are subject to severe erosion by running water.

NATURAL RESOURCE RESEARCH NEEDS:

Natural Resources Inventory -- Develop a natural resources inventory of plant and animal species to assist the park staff in properly managing and interpreting the area. (Botany, Zoology)

SOCIAL SCIENCE RESEARCH NEEDS:

Visitor Origin and Expectations -- Survey the visitors ages, expectations, points of origin, and other demographic data to adequately plan visitor services and gauge program effectiveness. (Sociology)

CULTURAL RESOURCE RESEARCH NEEDS:

Archaeological Surveys -- Over 250 historic period or archaeological remains are not documented in sufficient detail. Several specific, manageable projects could be developed including mapping and documenting construction techniques, studying structure functions, and evaluating the types of remains and their role in area railroad construction. (Archaeology)

Town of Promontory History -- Study the history and layout of the town of Promontory from its founding in 1869 to its abandonment around 1938. Archaeological research has already documented extant remains of Promontory. (History)

Administrative History -- Prepare an administrative history for the national historic site from 1907 to the present. The opportunity is developing to interview important personalities associated with the park's development and dedication on May 10, 1909. (History)

Museum Collection -- Update custodial records to comply with new National Park Service procedures and assist in the reorganization of the museum collection. Develop a museum collection storage and management plan. Catalog a large historic bottle collection (late 1800s) and develop a permanent exhibit plan for the bottles. (Museology)

WHO TO CONTACT:

Chief of Visitor Services
Golden Spike National Historic Site
Brigham City, Utah 84302
(801) 471-2208 or 471-2209



Grand Teton National Park

John D. Rockefeller, Jr. Memorial Parkway

PARK DESCRIPTION

Grand Teton National Park was established to protect the area's spectacular scenery, as characterized by the geologic features of the Teton Range, Jackson Hole, and the native plant and animal life. The original Grand Teton National Park (about 96,000 acres) was established by Congress on February 29, 1929, and later was enlarged to its present size by Congress on September 14, 1950. The park consists of 310,521 acres in Teton County, northwestern Wyoming, south of Yellowstone National Park. The park includes the Teton Range, mineral lakes, Jackson Lake, the sagebrush flats of Jackson Hole, and 25.5 miles of the Snake River. Towering 7,000 feet above the sagebrush flats of Jackson Hole, the peaks of the Teton Range dominate the park landscape. The Tetons, the youngest mountains of the Rocky Mountain chain, are a notable example of fault-block topography. The Teton Range has been proposed for addition to the National Wilderness Preservation System. The flora and fauna are typical of the central Rocky Mountain region. Grizzly bears, which are a threatened species, occasionally range into the northern part of the park. Bird life in the park is varied. Of particular interest are two species of endangered birds that nest in the park -- the bald eagle and peregrine falcon. The Snake River is an outstanding recreational resource as well as one of the last remaining natural habitats of the Snake River cutthroat trout. The natural scene contributes to the historic value of the park. Numerous archeological sites indicate the presence of prehistoric man, and historic structures represent the pioneer era, dude ranching, and the conservation movement.

Public law established the John D. Rockefeller, Jr. Memorial Parkway on August 25, 1972, for the purpose of commemorating the many significant contributions that John D. Rockefeller, Jr. has made to the cause of conservation in the United States, and

to provide both a symbolic and desirable physical connection between Grand Teton National Park and Yellowstone, the world's first national park. The parkway (23,770 acres) has traditionally been used as a staging area for backcountry use and a travel corridor between Grand Teton and Yellowstone National Parks. The parkway's recreational resources include hunting, fishing, and floating the Snake River.

NATURAL RESOURCE/SOCIAL SCIENCE RESEARCH NEEDS:

Fire Management -- Determine whether additional research will be needed to write adequate prescriptions for fire management units or portions of them. (Fire Ecology)

Threatened and Endangered Plants -- Develop a comprehensive list of rare or unique plants, map their distribution in the park, and document their ecological requirements as given in the scientific literature. (Plant Ecology, Botany, Plant Taxonomy)

Hazard Trees -- Summarize the history and causes of tree failure in the park and parkway and the effectiveness of the hazard tree management program. (Forestry)

Bighorn Sheep -- Monitor the bighorn sheep population size, sex and age composition, and distribution year-round. (Wildlife Biology)

Moose -- Investigate the feasibility of reducing the potential for collisions between moose and vehicles. (Wildlife Biology, Park Management)

Osprey -- Study the wintering areas and migration routes of ospreys that nest in the park, since their status in the park may be influenced by what happens to them outside the park. (Ornithology)

Mountain Goat -- Synthesize current knowledge about the possible effects of mountain goats on the park ecosystem, with special emphasis on their relationship to bighorn sheep. (Wildlife Biology)

Animal Problems in Developed Areas -- Determine the animal species in the park and parkway that are problems in developed areas, their distribution, and habitat selection. (Animal Ecology, Vertebrate Pest Management)

Aquatic Life -- Study fish species other than trout, particularly abundant species. (Ichthyology)

Natural Spawning Area -- Determine the condition of streams where little or no cultural spawning occurs to determine which streams, if any, have potential for natural spawning areas. (Fishery Biology, Aquatic Ecology)

Snake River Floodplain -- Develop a floodplain vegetation map. (Hydrology, Botany)

Raptor Ecology/Recreational Impacts -- Research the possible effects of foot trips on the foraging activity of osprey and the endangered bald eagle. (Avian Ecology)

Domestic Livestock Grazing -- Document the history of livestock grazing in the park and its current status in a format most useful to park managers for ensuring continuity and consistency in the grazing management program. Include accurate maps of grazing allotments and leases and the kinds of use on the allotments (e.g., irrigated or nonirrigated pastures, hayland, etc.). (Range Science)

Backcountry Management -- Determine the appropriate ecological and sociological carrying capacities or limits of acceptable change for visitor use in various land management and use zones, but particularly in areas recommended for wilderness designation. (Recreation Management, Natural Resource Management, Sociology, Ecology)

Cave Management -- Inventory, describe, and map caves in the park and parkway. Locate caves and pits on aerial photographs and planimetric maps. (Geomorphology, Speleology)

Great Horned Owl Nesting Sites -- Document and map territories and nest sites of great horned owls nests. (Ornithology)

Geology -- Determine the geological studies needed for the park and parkway. (Geology, Geomorphology)

Trail Riding -- Study the effects on soils, especially from erosion and compaction, and other natural resource disturbance from trail riding activities. (Soil Science)

RESEARCH NEEDS

Visitor Use -- Update the visitor use survey to determine the current levels of use throughout the park and parkway, length of visits, visitor activities, etc. (Sociology, Statistics)

CULTURAL RESOURCE RESEARCH NEEDS

Historical Resource Base Map -- Prepare the maps required for all architectural and historic features to identify significant resources, sites, and event locations. (Geography)

Museum Collection -- Update the inventory and compile a catalog of the cultural collection. (Museology)

Archaeology -- Carry out archaeological surveys in specific areas, prepare archaeological contexts-of-significance, and analyze the existing archaeological collections. (Archaeology)

Dude Ranching -- Update the study on early dude ranching in the park. (History)

Archaeological Surveys -- Systematically survey and map the archaeological resources in the 20 percent of the park. Eighty percent of the park already has been surveyed for archaeological resources. (Archaeology)

Historic Resource Base Map -- Prepare a base map showing the locations for historic homesteads, farming and ranching activities, trails and roads, dude ranching, and other buildings. (History)

Administrative History -- Research and write an administrative history for the park and parkway. (History)

Historic Photographs -- Update the park's historic photograph and map register. (History)

Concessions History -- Prepare a history study for all concessions with special emphasis on the operations patterns and management. (History)

Oral Histories -- Prepare oral histories on a variety of areas and subjects. Conduct interviews with early residents of Jackson Hole, former park employees, and others with knowledge of early park history. (History)

Geographic Information System (GIS) -- Digitize historic, archeological, and other cultural resource maps using GIS procedures and standards. (Computer Science, History, Archeology)

Mission 66 Projects -- Prepare a study on the role and philosophy of the Mission 66 program in Grand Teton National Park development. (History)

Civilian Conservation Corps (CCC) -- Prepare a study on the role of the CCC in the development of Grand Teton including organization, projects, accomplishments, etc. (History)

WHO TO CONTACT:

Natural Resources:

Assistant Superintendent
Research and Resource Management
Grand Teton National Park
P.O. Box 170
Moose, WY 83012
(307) 733-2660

Cultural Resources:

Chief of Interpretation
Grand Teton National Park
P.O. Box 170
Moose, WY 83012
(307) 733-2660



Grant-Kohrs Ranch National Historic Site

PARK DESCRIPTION:

Grant-Kohrs Ranch National Historic Site was established in 1972 "to provide an understanding of the frontier cattle era of the Nation's history, to preserve the Grant-Kohrs Ranch, and to interpret the nationally significant values thereof." The 265-acre site includes 53 original historic structures and approximately 12,000 artifacts. The site, structures, and objects possess a high degree of integrity. The ranch began operating in the early 1880s and is still stocked with horses and cattle today.

NATURAL RESOURCE RESEARCH NEEDS:

Natural Areas -- Survey the flora and fauna, and add missing specimens to the herbarium. Begin a small mammal, bird, and insect collection. (Botany, Ornithology, Entomology, Mammalogy, Taxonomy)

CULTURAL RESOURCE RESEARCH NEEDS:

Brochure of Ranch Equipment -- Prepare a brochure illustrating the use of ranching equipment. (Interpretation, History)

Brochure of Historic Ranch Vehicles and Equipment -- Prepare an illustrated guide for displayed vehicles and equipment. (Interpretation, History)

Artificial Insemination History -- Study the early development of the artificial insemination of horses and cattle, concentrating on the Grant-Kohrs Ranch. (History)

Ranching Operations -- Analyze the existing records, oral histories, and museum collection to provide information about the ranching operation including

numbers and types of equipment, typical activities, schedules, and number of employees. (History)

Museum Collection -- Reclassify unidentified objects in the museum collection according to the actual object name in the nomenclature. (Museology)

Ranching History -- Study ranch size, grazing lands, number of cattle, and employees at various periods. (History)

Minority Relations -- Study the ranch's history in relation to minorities including employment, contact, and attitudes. (History, Anthropology)

Bibliography -- Develop an annotated bibliography of books, articles, and manuscripts related to the frontier cattle era, the Grant-Kohrs Ranch, and the development of cattle ranching in the West. (History)

WHO TO CONTACT:

Curator
Grant-Kohrs Ranch National Historic Site
Big Hole National Battlefield
P.O. Box 790
Deer Lodge, MT 59722
(406) 646-2070



Great Sand Dunes National Monument

PARK DESCRIPTION:

Great Sand Dunes National Monument was established on March 17, 1932, to preserve the Great Sand Dunes and nearby features of scenic, scientific, and educational interest. This 38,951-acre park contains some of the largest and highest dunes in the United States. These dunes were deposited over thousands of years by southwesterly winds carrying sands from the surrounding high mountain deserts to the base of the Sangre de Cristo Mountains. As the winds rose and continued through the mountain passes, the heavy sands precipitated and accumulated on the valley floor.

NATURAL RESOURCE/SOCIAL SCIENCE RESEARCH NEEDS:

Water Resources - Develop a water resource plan analyzing alternatives for water use and their related impacts. This information would aid management decisions and provide data for interpreting programs. (Hydrology)

Natural Areas - Survey the baseline conditions of geological, faunal and floral resources, and climatological processes. Complete a soil survey. Provide detailed inventories of major flora and fauna, and study ecological relationships. Dune plant ecosystems appear to be unique and are not well understood. They may be sensitive to adverse visitor use and air quality degradation. (Geology, Botany, Zoology, Meteorology, Ecology, Soil Science)

Trespassing Livestock - Study alternatives to protect the dunes from the yearly trespass of cattle. There are approximately 15 miles of fencing along the monument's south and west boundaries to prevent trespass grazing. Periodically, sections of the boundary fence are either covered or undermined by

wind-blown sand. (Range Science, Natural Resource Management, Engineering)

Backcountry Use/Wildlife - Document the impacts of backcountry camping, day hiking, and motor vehicle use on deer, elk, and black bear. (Wildlife Biology, Sociology)

Campground Rehabilitation - Study alternative soil erosion measures, regeneration of impacted sites, and identify potential problems for future management. The Pinyon Flats Campground was constructed 20 years ago on a hillside with unstable sandy soil. (Soil Science, Botany, Engineering)

CULTURAL RESOURCE RESEARCH NEEDS:

Historic Base Map - Prepare a historic base map. (History)

Archeology - Systematically survey and evaluate selected areas for resources eligible for the National Register of Historic Places. (Archeology, History)

Aboriginal Scarred Trees - Document the scarred trees in detail. Great Sand Dunes has the largest known stand of culturally scarred trees. (Archeology)

Contexts of Significance - Prepare prehistoric and historic contexts of significance for establishing criteria for properties to be nominated to the National Register of Historic Places. This can be done as one or two projects. (Archeology, History)

WHO TO CONTACT:

Chief Ranger
Great Sand Dunes National Monument
Mosca, CO 81146
(719) 378-2312



Jewel Cave National Monument

PARK DESCRIPTION:

Jewel Cave National Monument was created in 1908 to protect a small but unique cave system found in the Black Hills of western South Dakota. Jewel Cave is the fourth longest cave known in the world and second longest in the United States. It contains several unique and rare cave formations found in only a few other places in the world. Jewel Cave National Monument also protects natural and cultural surface resources typifying the southern Black Hills including indications of prehistoric human presence and known historic sites.

NATURAL RESOURCE RESEARCH NEEDS:

Cave Fauna -- Survey transition zones for cave fauna and determine the specific conditions that support individual fauna types. (Animal Ecology, Biology)

Fire -- Compile a fire history for the park and surrounding area. (Fire Ecology)

Bats -- Survey summer and winter bat distribution, population, and habitat requirements to document seasonal use patterns and the impacts of human use on the winter hibernation sanctuary. (Mammalogy)

Wildlife -- Study the distribution, population, and habitat requirements for mammals and birds, and correlate data with data from other land management agencies to guide future cooperative wildlife management activities. (Wildlife Biology, Ornithology)

Water Resources -- Develop baseline water budget information for the monument and surrounding area for both surface and subsurface water needs. (Hydrology)

CULTURAL RESOURCE RESEARCH NEEDS:

Historic Resource Base Map -- Survey the monument for evidence of historic period human use and document all sites on a base map. (History, Anthropology)

Civilian Conservation Corps (CCC) -- Research the CCC era and its impact on the use and development of the monument and surrounding area. Include an oral history with Jewel Cave CCC camp members that are still living. (History)

Cave Exploration History -- Complete an oral history tape with Herb and Jan Conn and others on the Jewel Cave exploration. (History)

Museum Collections -- Inventory and compile a catalog of the museum and research collections. (Museology)

Archaeological Survey -- Complete a systematic archaeological survey and evaluation of sites for eligibility to the National Register of Historic Places. (Archeology, History)

Contexts of Significance -- Prepare prehistoric and historic contexts of significance that are to be used in evaluating cultural properties for the National Register of Historic Places. This can be addressed as one or two projects. (History, Archeology)

WHO TO CONTACT:

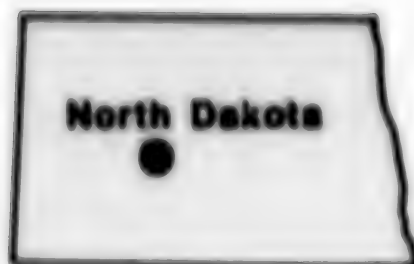
Natural Resources:

Chief Ranger
Jewel Cave National Park
Custer, SD 57730
(605) 673-2266

Research Biologist
Windsor Cave National Park
Hot Springs, SD 57747
(605) 745-4600

Cultural Resources:

Chief Ranger
Jewel Cave National Monument
Custer, SD 57730
(605) 673-2266



Knife River Indian Villages National Historic Site

PARK DESCRIPTION:

Knife River Indian Villages National Historic Site, authorized in 1974, is the newest park area in the National Park Service's Rocky Mountain region. The 1,250 acres preserve the best surviving examples of earthlodge villages inhabited by the Hidatsa and Mandan cultural groups of the Northern Great Plains, with accumulated deposits from perhaps 6,000 to 8,000 years of occupation. Early exploration and westward expansion by Euro-Americans to the Upper Missouri brought many famous visitors including Henry, Bradbury, Catlin, Bodmer, Prince Maximilian, Audubon, Lewis and Clark, and others. Park vegetation includes elm, cottonwood, ash forest along the river bottom lands, and thick stands of short prairie grass throughout the upper terraces.

NATURAL RESOURCE RESEARCH NEEDS:

Noxious Plants - Prepare a base map showing noxious weeds and outline the strategies for control. (Botany, Pest Management)

Vegetation Management - Prepare a management plan for the natural vegetation resources. Determine the historic plant communities and methods to restore and manage them. (Botany, Restoration Ecology)

River Erosion/Cultural Resources - Determine the impacts of natural erosion on cultural resources along the Knife River. Establish permanent monuments to measure erosion rates. (Hydrology, Cultural Resource Management)

Fire/Cultural Resources - Determine the effects of wild and prescribed fire on subsurface archaeological resources, and incorporate the data into the vegeta-

tion management plan. (Fire Ecology, Archeology, Cultural Resource Management)

Rodents - Develop an integrated pest management model for reducing destructive rodent activity on archaeological sites. (Wildlife Biology, Integrated Pest Management, Archeology)

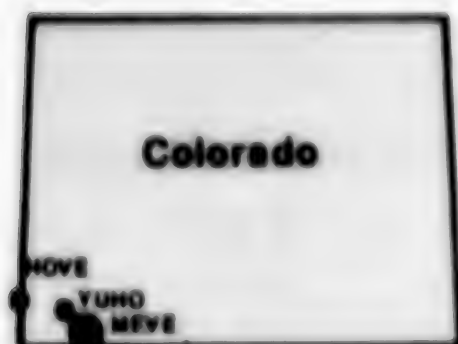
CULTURAL RESOURCE RESEARCH NEEDS:

Ethnohistory - Identify living descendants of individuals who occupied Mandan and Hidatsa villages in the Knife River Indian villages circa 1750-1860, and collect oral histories and photographic data on the site. (Anthropology)

Bibliographic Inventory - Gather archival, photographic, and artistic records of historic Mandan and Hidatsa villages. Collate and annotate collections for a computer index to facilitate research and interpretation. (History)

WHO TO CONTACT:

Superintendent
Knife River Indian Villages National Historic Site
R.R. 1, Box 166
Barton, ND 58571
(701) 745-3309



Mesa Verde National Park

Hovenweep National Monument

Yucca House National Monument

PARK DESCRIPTION:

Mesa Verde National Park was established in 1906 to preserve the ruins of hundreds of prehistoric Indian dwellings built on the mesa tops and in the rugged canyon caves. The plant and animal habitats range from mountain shrub complexes through pinyon/juniper forests to salt brush canyons, including approximately 4 miles of riparian river habitat. The biological diversity stems from a system of mesas, canyons, and plateau escarpments with over 800 localized water sites. Mesa Verde National Park is one of the few areas with a Sierra Madrean plant community. The view of this unique area from Park Point, the highest elevation in the park, is so spectacular that the 58th Congress stated that it is "one of the grandest and most extensive views in the country."

The Mesa Verde Superintendent also administers Hovenweep National Monument and Yucca House National Monument. Hovenweep National Monument contains 784 acres on which can be found prehistoric Pueblo Indian ruins. Yucca House contains approximately 10 acres on which are the archeological remains of an ancient Indian village.

NATURAL RESOURCE/SOCIAL SCIENCE RESEARCH NEEDS:

Nonvascular Plants – Survey the nonvascular flora and microflora to consolidate available data, determine information voids, and protect rare species. (Botany, Microbiology, Plant Taxonomy)

Insects – Classify insects in the collection, catalog by species, and prepare a check list. (Entomology, Invertebrate Taxonomy)

Natural Areas – Study the baseline flora and fauna conditions and geological correlations on Park Mesa, a roadless mesa that includes mountain shrub, pinyon, juniper, and canyon slopes. (Geology, Aquatic Ecology, Zoology, Botany)

Acid Rain/Air Quality – Study acid rain data, air quality data, and vegetation to establish baseline conditions and air quality impacts. (Ecology, Plant Pathology, Atmospheric Science)

Biological Controls – Study insect controls of exotic plant species, insects' influence on the pinyon/juniper forest, and the importance in the biological pyramid. (Forestry, Integrated Pest Management, Biology, Entomology)

Insects – Inventory insects and relate to habitat type. Study habitats, interactions, and other ecological aspects of insect populations. (Insect Ecology, Entomology)

Fresh Water Invertebrates – Inventory fresh water crustaceans, arachnids, mollusks, and various types of worms, etc. (Invertebrate Taxonomy, Invertebrate Zoology)

Wildlife Management – Document the impacts to the park game species of hunting and trapping on lands adjacent to the park, include deer, elk, coyote, bobcat, bear, and mountain lion. Determine species movements in and out of the park. (Wildlife Biology)

Soil Buffering Capacity – Sample soil types from geologic formations for analysis, determine calcium carbonate content, Ph, and other factors relevant to acid rain deterioration. This would be a long term study to record changes over many years. (Geology, Soil Science, Ecology, Chemistry)

Reptiles and Amphibians -- Define reptile and amphibian distribution, population status, and habitat requirements. (Herpetology)

Aquatic Invertebrates -- Survey taxonomic composition, distribution, and population density of aquatic invertebrates, including adult and immature insects, arachnids, and fresh-water crustaceans. Study sites may include the Mancos River and some mesa top/canyon water sites. (Entomology, Invertebrate Taxonomy)

Aquatic Vertebrates -- Prepare baseline surveys of the taxonomic composition, distribution, and population density of aquatic vertebrates, fish, amphibians in the Mancos River, and amphibians in some mesa top/canyon water sites. (Aquatic Ecology, Vertebrate Taxonomy)

Nesting Raptors -- Survey nesting sites and determine the range and habitat use for peregrine falcons (endangered), prairie falcons, goshawks, Coopers hawks, sharp shinned hawks, golden eagles, red-tailed hawks, great horned owls, flammulated owls, spotted owls, saw whet owls, and long-eared owls to reduce conflicts with visitors. (Ornithology, Avian Ecology)

Turkeys -- Evaluate possible causes of wild turkey extirpation within park as well as the available habitat and potential success of reintroduction. (Ornithology, Avian Ecology)

Mammals -- Study the distribution, population status, and habitat requirements of mammal species that are inadequately known or at the limits of their geographic range, including Canada lynx, wolverine, Merriams shrew, badger, mink, and beaver. (Wildlife Biology, Biogeography)

Shrew -- Research the distribution and population of *Sorex merriami* and *Sorex vagrans* occur, however records are scant and provide virtually no basis for management and interpretation. (Wildlife Biology)

Abert Squirrel -- Determine the population status and habitat requirements of this squirrel for more effective management and interpretation. (Wildlife Biology)

Fire -- Evaluate and map fire history and present day fuel accumulation in all vegetation communities. (Fire Ecology)

Bighorn Sheep -- Document the range, population density, overall physical condition, and habitat use for bighorn sheep to determine the population dynamics. (Wildlife Biology)

Visitor Feeding of Mammals -- Determine the actual ecological and physiological effects of unnatural food sources on mammals to more effectively manage these identified species in human impact areas, and to improve public awareness of the problem. (Mammalogy, Wildlife Biology, Sociology)

Plant/Soil Relationships -- Sample soils in major habitat types and unusual plant communities (such as Pleistocene remnant stands). Determine soil chemicals and structure and note the correlation between chemical properties and plant communities. (Botany, Soil Science, Plant Ecology)

CULTURAL RESOURCE RESEARCH NEEDS:

Museum Collection Management -- Catalog the backlog of archeological artifacts, update the curatorial records to comply with the new National Park Service procedures, and place museum records (i.e., accession and catalog cards) onto the computer-based system. (Museology)

Historic Photographs -- Check the information and enter it into the computerized catalog and indexing system. (History, Computer Science)

Artifacts -- Research and describe the artifacts from Mesa Verde that are stored in other institutions. (History, Archeology)

Photographs -- Locate and describe the significant collections of Mesa Verde photographs. (History)

Fire/Archeological Resources -- Investigate the effects of wildfire and/or prescribed fire on surface and subsurface cultural resources. (Archeology, Fire Ecology)

Prehistoric Vegetation -- Research the natural and cultural records to determine the vegetation types

during the Anasazi occupation. (Archeology, Botany)

Oral History -- Conduct interviews with early residents of the area, former park employees, and others with knowledge of early park history. (History)

Historic Resources Base Maps -- Prepare a base map showing architectural and other historic features and identify these as significant resources, sites, and event locations related to historic period human history in Mesa Verde National Park. Prepare a map showing all known historic trails. (History)

Geographic Information System (GIS) -- Digitize historical, archeological, and other cultural resource maps using GIS procedures and standards. (Geography)

Archeological Site Map -- Prepare detailed plans to scale and profiles for unmapped archeological ruins. (Archeology)

Prehistoric Ruins Stabilization Assessments -- On a prioritized basis, prepare prehistoric ruins stabilization assessments for those sites requiring stabilization as a means of documenting site condition, justifying stabilization money requests, and prioritizing stabilization work. (Architecture)

Prehistoric Ruins Stabilization Monitoring Programs -- Develop a long-range program for monitoring site conditions for those sites that have been stabilized or require stabilization. (Engineering, Architecture)

Stabilization Projects Report -- Prepare a comprehensive report of previous site stabilization projects that will aid future stabilization work and scientific investigation. (Architecture, History)

WHO TO CONTACT:

Natural Resources:

Superintendent
Mesa Verde National Park, CO 81330-0008
(303) 589-4465

Resource Management Specialist
Mesa Verde National Park, CO 81330-0008
(303) 589-4461 or 589-4506

Cultural Resources:

Superintendent or
Chief of Research and Cultural Resources
Mesa Verde National Park, CO 81330-0008
(303) 589-4465 or 589-4510



Mount Rushmore National Memorial

PARK DESCRIPTION:

Colossal heads of Presidents George Washington, Thomas Jefferson, Abraham Lincoln, and Theodore Roosevelt were sculpted by Gutzon Borgum on the face of a granite mountain. Mount Rushmore National Memorial contains more than 1,200 acres.

NATURAL RESOURCE RESEARCH NEEDS:

Peregrine Habitat -- Evaluate the existing conditions at the monument to determine the potential for reintroduction of the endangered peregrine falcon. (Avian Ecology)

CULTURAL RESOURCE RESEARCH NEEDS:

Museum Collection -- Maintain and update the inventory and compilation of the park's museum collection. (Museology)

WHO TO CONTACT:

Superintendent
Mount Rushmore National Memorial
P.O. Box 268
Keystone, SD 57751-0268
(805) 574-4145



Natural Bridges National Monument

PARK DESCRIPTION:

Natural Bridges National Monument is on Cedar Mesa in southeastern Utah. This isolated, sweeping mesa, at 6,000 feet, is incised by deep canyons that contain many sandstone alcoves and rich riparian zones. The monument was created to preserve these extraordinary sandstone bridges and numerous prehistoric resources.

A large percentage of the monument's land surface is badrock, and soils are weakly developed. Vegetation boundaries are usually sharp, corresponding to abrupt changes in substrate or available moisture. The vegetation is predominantly pinyon/juniper woodland which covers the mesa top. Canyon walls support pockets of ponderosa pine, Douglas fir, and hanging gardens. Raptors, other birds, mammals, reptiles, and amphibians can be found here. Larger predators include coyote, bobcat and gray fox, badger, mountain lion, and bobcat. There is abundant evidence of intensive aboriginal use during Basket-maker and Anasazi times.

NATURAL RESOURCE/SOCIAL SCIENCE RESEARCH NEEDS:

Natural Areas - Study and survey the baseline conditions and any unusual ecological factors of flora and fauna in pristine areas. Compare community parameters of these pristine areas with disturbed areas to determine the degree of disturbance and the potential for recovery. (Ecology, Botany, Wildlife Biology)

Nesting Raptors - Survey nesting habitat and determine the range for all raptors, owls, and owls to determine density and population dynamics. (Avian Ecology, Ornithology)

Hanging Gardens - Survey the hanging gardens to determine the status of this sensitive habitat. Compare the hanging garden communities of the same type in different areas of the park. (Plant Ecology, Botany)

Mammalian Predators - Study the ecology of mountain lion, bobcat, coyote, badger, fox, and raptorial. Study the potential impact that increasing numbers of visitors and/or hunting and trapping outside the park are having on these predators. Study the relationship between mountain lion predation and bighorn sheep numbers. (Animal Ecology, Wildlife Biology, Zoology)

Pre-Columbian Plant Communities - Identify the species composition of pre-Columbian plants in areas that were disturbed during the last 100-200 years, and that have been preserved for only the last 10-20 years. Methods may include: (1) comparing phytoliths and carbon isotopes ratios in recently produced soil with older soils, (2) quantitatively comparing plant species composition of relic areas with disturbed areas that have similar physical environments, and (3) identifying past soil erosion patterns using radiocarbon dating. (Ecology, Plant Ecology, Plant Taxonomy, Chemistry, Soil Science)

Palaeoecology - Study ephemeral rock pool microhabitat population dynamics and community structure, island biogeography, productivity, nutrient dynamics, and their importance to terrestrial systems. (Aquatic Ecology)

Invertebrate Ecology - Study invertebrate ecology, develop a species list and collect specimens. Studies may include: (1) plant-habitat interactions (especially single leaf ash and round fungi), (2) pollinators.

tion, and (3) vertebrate parasites. (Insect Ecology, Entomology, Invertebrate Taxonomy)

Disturbed Sites Reclamation - Research reclamation techniques to answer the following questions: (1) Is revegetation sufficient to reclaim an area and will wildlife return without reintroduction efforts? (2) What are the germination requirements for the dominant species in each habitat type? (3) What is the viability of seed collected for revegetation? (4) What environmental conditions best enhance the establishment of seedlings, whether planted as seeds or tublings? (5) Can cryptogamic crusts be reintroduced using slurries of cryptogams from other sites, will the slurries that are taken from other sites recover on their own, what would be included in a slurry mix (e.g., added nutrients, soil binders, etc.), and do all species in a cryptogamic crust need to be in the slurry for successful recolonization? (Plant Ecology, Plant Physiology, Microbiology, Restoration Ecology)

Relationship of Vegetation to Environment - Survey plant communities to update and fine tune vegetation maps of the park, and correlate plant communities with various environmental factors (e.g., soil type, aspect, parent rock, elevation, etc.). The project will make use of Geographic Information System (GIS) data available, and generate data on overlays suitable for digitizing and incorporating into GIS. (Plant Ecology, Geography, Computer Science, Soil Science)

Plant Diseases - Study the mechanisms causing foliage damage of Utah juniper. (Preliminary studies suggest a serious disease that may be correlated with park roads.) Identify the pathogen and recommend treatment. (Plant Pathology, Plant Ecology, Insect Ecology)

Community Comparisons - Assess the degree of similarity among widely separate, but seemingly similar, plant and animal communities. (Ecology, Animal Ecology, Plant Ecology, Insect Ecology)

Campground Use and Resource Impacts - Study the effects of concentrated human activities on surrounding natural areas, including vegetation, vertebrates, and invertebrates. (Ecology, Plant Ecology, Animal Ecology, Insect Ecology, Sociology)

Water Relations of Selected Plant Species - Com-

pare water use rates of native and non-native riparian plant species, addressing both equivalent leaf area and actual plant density at a site. Determine what role water consumption plays in the exclusion of native annuals and perennials by non-native annuals. (Plant Ecology, Plant Physiology)

Air Pollution Damage - Pinpoint the sensitive areas and species, and document the damage, paying special attention to potholes, cryptogams, or sensitive species that may act as bioindicators. (Chemistry, Botany, Atmospheric Science)

Cryptogamic Studies - Study general cryptogam ecology including factors controlling distribution, species diversity, nitrogen-fixing capabilities, and response to disturbance. (Ecology, Botany)

Deer Ecology - Determine the population structure, distribution, and forage utilization. (Wildlife Biology, Animal Ecology)

Flora of Natural Bridges - Survey the park, compile an updated plant list and establish a herbarium. (Botany, Plant Taxonomy)

Cacti Survey - Survey cacti, determine species, and examine the clinal variations among species. (Botany, Plant Taxonomy, Plant Ecology)

Biogeography of Plants on the Colorado Plateau - Survey plant communities in the area and examine the relationships between them, both past and present. (Biogeography, Botany, Plant Ecology)

Exotic Plants - Study the ecology of exotic plant species (such as *Tamarix arborescens*, *Bromus tectorum*, *Salix bebbiana*, and *Centaurea juncoides*) and determine the population dynamics, community structure, water relations, and factors enabling invasion. Recommend control options. (Botany, Plant Ecology)

Rare Plants - Verify and map rare plant populations. Identify plant numbers, population boundaries, and habitat characteristics. Survey the area for similar habitats to determine the expansion potential. (Botany, Plant Ecology)

Plant Communities' Structure - Study the isolated relic plant communities, identify age, population dynamics, community structure, and possible

origins (using peck pit middens, core samples, electrophoresis, etc.). The communities include Douglas fir, ponderosa pine, aspen, and manzanita (Plant Ecology, Botany, Paleontology, Biochemistry, Biogeography)

Bioindicators - Identify the indicator species and the disturbances to which they are sensitive (Ecology, Biology, Chemistry)

Mammals, Reptiles, and Amphibians - Determine the distribution, population status, and habitat requirements of mammal, reptile, and amphibian species (Wildlife Biology, Herpetology, Animal Ecology)

Riparian Birds - Survey riparian bird species during migration and nonmigration periods. Document their habitat use and susceptibility to disturbance (Ornithology, Avian Ecology)

Plant Productivity - Ascertain the productivity of selected plant species and habitats within the ungrazed park portions and compare with the data gathered from other parks that allow grazing (Botany, Plant Ecology, Range Science)

Bighorn Sheep Reintroduction - Determine the suitability of habitat for sheep reintroduction into the Natural Bridges National Monument area (Wildlife Biology, Animal Ecology)

Reptiles - Analyze and collect more data to define distribution, population status, and habitat requirements of the midget faded rattlesnake (*Crotalus viridis concolor*). Monitoring the snakes by mark and recapture has been ongoing for five summers within the residence area. (Herpetology, Animal Ecology)

CULTURAL RESOURCE RESEARCH NEEDS:

Rock Art Conservation - Determine the impacts, both natural and human, occurring at rock art sites and develop the specific strategies for performing the necessary conservation work. (Archeology)

Museum Collection Management - Update the curatorial records to comply with new National Park Service procedures. (Museology)

Archeological Survey - Inventory and evaluate ar-

cheological sites for eligibility to the National Register of Historic Places. (Archeology)

Contexts of Significance - Prepare prehistoric and historic contexts of significance that will be used in evaluating cultural properties for the National Register of Historic Places. This can be addressed as one or two projects. (History, Archeology)

WHO TO CONTACT:

Natural Resources:

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Colorado

Rocky Mountain National Park

PARK DESCRIPTION:

Rocky Mountain National Park was established in 1915 to protect the scenery and natural environment of a superlative alpine area along the Continental Divide in Colorado. The mountains, valleys, forests, and waters are managed to perpetuate the vegetation and ecosystems, and to minimize the impact of visitor use on park resources. Elevation ranges from approximately 8,000 to over 14,000 feet. Park managers have enhanced populations of native plants and animal species and restored some species that were gone or rapidly disappearing early in the century. Nearly one-third of the park's 414 square miles is above timberline, with a vast and fragile tundra ecosystem. The park also contains evidence of prehistoric occupancy and travel, and there are historic sites dating from the periods of settlement, ranching, resort development, and road building.

NATURAL RESOURCE/SOCIAL SCIENCE RESEARCH NEEDS:

Aquatic Macrovertebrates -- Survey the taxonomic composition, distribution, and population density of aquatic vertebrates. (Aquatic Ecology, Vertebrate Taxonomy)

Research Natural Areas -- Survey the baseline conditions of the flora and fauna and any unusual ecologic factors in Paradise Park, Specimen Mountain, and West Creek (three large, nearly pristine tracts that have been preserved since 1973) for ecologic comparison with more disturbed areas. (Ecology, Aquatic Ecology, Zoology, Botany)

Nonvascular Plants -- Survey the nonvascular flora and microflora to consolidate the available data, determine information voids, and protect rare species. (Botany, Microbiology, Plant Taxonomy)

Wildlife/Backcountry Use -- Document the impacts of backcountry camping and the increasing volumes of day hiking on elk, deer, bighorn sheep, black bear, cougar, and bobcat. (Wildlife Biology, Sociology)

Elk Range -- Survey the winter distribution and range utilization of migrating elk outside the park to help plan management actions in cooperation with other agencies. (Wildlife Biology, Range Science)

Dwarf Shrew -- Survey the winter distribution and population status of *Sorex nanus*. The type locality of *Sorex nanus* is Estes Park, however, records are scant and provide virtually no basis for management and interpretation. (Wildlife Biology)

Special Mammals -- Study the distribution, population status, and habitat requirements of species that are inadequately known or at the limits of their geographic range, including Canada lynx, wolverine, pygmy shrew, and badger. (Wildlife Biology, Biogeography)

Bald Eagle/Winter Use -- Document the impacts of snowmobiling and cross-country skiing on endangered bald eagles that winter near Shadow Mountain Reservoir to determine future winter use and management along the lakeshore. (Ornithology, Recreation Management, Avian Ecology)

Nesting Raptors -- Survey nesting sites and determine the range and habitat for osprey, prairie falcon, goshawk, golden eagle, red-tailed hawk, and certain small owls to reduce the conflicts between these species and backcountry visitors. (Ornithology, Avian Ecology)

Bighorn Sheep -- Prepare baseline studies to document the range, population density, and habitat use for the bighorn sheep that have begun repopulating

the southern portion of the park. In another study, determine the effects that artificial salt sources outside the park have on bighorn sheep. (Wildlife Biology)

River Otter -- Gather current information on the population status, distribution, and feeding habits of the state-endangered river otter, a species that was reintroduced in Kaawuneeche Valley in 1978. (Wildlife Biology)

Abert Squirrel -- Determine the abert squirrel population status and habitat requirements for more effective management and interpretation. (Wildlife Biology)

Rodents/Visitor Feeding -- Determine the actual ecologic and physiologic effects of unnatural food sources on ground squirrels and chipmunks to more effectively manage these species in human impact areas and to improve public awareness of this problem. (Wildlife Biology, Sociology)

Exotic Birds -- Gather information on the distribution, habitat, and effect of exotic birds on native species to determine the feasibility of controlling non native species such as house sparrows, rock doves, and starlings. (Ornithology)

Reptiles and Amphibians -- Define the distribution, population status, and habitat requirements of reptile and amphibian species. (Herpetology)

Aquatic Ecosystem/Fishing -- Determine the impact of angling on lakes, streams, and shorelines to more effectively manage the recovery of native fish in waters also occupied by non-native species. (Fishery Biology, Aquatic Ecology, Recreation Management)

General Wildlife Inventory -- Determine the population and distribution of the minor wildlife species and their habitat. (Wildlife Biology)

CULTURAL RESOURCE RESEARCH NEEDS:

Historical Resource Base Map -- Prepare the maps required for all architectural and historic period features to identify significant resources, sites, and event locations. (History)

History Trails -- Prepare a history of the historic trails

with particular emphasis on the Ute Trail and the Flat-top Mountain Trail. (History)

Old Fall River Historic District -- Prepare a historic resource study of the Old Fall River Historic District including material about Convict Cabins, Willow Park Ranger Station and Stable, Timberline Cabin, Fall River Pass Store, Fall River Pass Ranger Station, Alpine Visitor Center, and Old Fall River Road. (History)

Archeology -- Carry out archeological surveys in specific areas, prepare an archeological contexts of significance, and analyze existing archeological collections. (Archeology)

Contexts of Significance -- Prepare the prehistoric and historic contexts of significance that will be used in evaluating cultural properties for the National Register of Historic Places. This can be addressed as one or two projects. (History, Archeology)

Dude Ranching -- Prepare a study on early dude ranching and resort activity. (History)

Museum Collection -- Inventory and compile a catalog of the cultural collection. (Museology)

WHO TO CONTACT:

Natural Resources:

Research Biologist
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Cultural Resources:

Chief Park Naturalist
Rocky Mountain National Park
Estes Park, CO 80517
(303) 586-2371



Theodore Roosevelt National Park

North, South & Elkhorn Units

PARK DESCRIPTION:

Theodore Roosevelt National Park was established in 1947 to memorialize Roosevelt for his outstanding contributions to conservation, and to interpret and conserve the native flora and fauna and geologic splendor of the Little Missouri River Badlands where he ranched in the late 19th century. The 70,634-acre park is managed to perpetuate the geologic processes and the mixed-grass prairie ecosystem. Native plants and animals have been reestablished. Elk, bison, and bighorn have been reintroduced and native flora are managed so as to exclude exotic plants. Extensive energy development in the area has raised concerns over possible degradation of the scenic values and air quality of the park. There is evidence of prehistoric occupancy, hunting, and travel, as well as the remains of old ranches and homesteads.

NATURAL RESOURCE/SOCIAL SCIENCE NEEDS:

Fire -- Survey the park and surrounding areas for regional fire history using historic journals and reports, and vegetative techniques including dendrochronology. (Fire Ecology, Forestry, History)

Exotic Plants -- Map the exotic plant infestations. Prepare overlays showing exotic plant treatments over the past 10-12 years and determine the ecological significance of these exotic plants. (Plant Ecology)

Wild Horses -- Study the distribution, range use, and ecology of wild horses in the badlands. Identify their impacts on resources and ecological relationships to other large herbivores. (Wildlife Biology, Animal Ecology, Natural Resource Management)

Bison Herd -- Research the effects of artificial selection on population characteristics, social structure, gene pool, and genetic diversity. (Genetics, Behavioral Ecology, Wildlife Biology)

Lichens -- Identify several indicator lichen species with unknown sensitivity to sulfur oxide (SO) pollution. Fumigate, analyze, and report the SO sensitivity in both laboratory and field experiments. (Biology, Biochemistry, Atmospheric Science)

Air Pollution Damage to Plants -- Determine the endemic present-day quantity, occurrence and variability of injuries to vascular plants resulting from phytophagous insects, microbes, and physiological stress, and compare to injuries caused by air pollution. (Plant Pathology, Plant Physiology, Botany, Atmospheric Science)

Air Quality Values -- Research the importance to visitors of vistas unobstructed by air pollution or visual impediments. Ascertain the effect that unobstructed vistas have on local, state, and regional economics. Determine the tradeoffs that visitors are willing to make to ensure unobstructed vistas, and compare the responses of local, regional, and nationally-based visitors. (Economics, Sociology)

Water Quality -- Complete a water quality analysis for the Little Missouri River drainage, identifying key attributes to be monitored in the future, existing or potential pollution sources, and recommendations for managing the riverine environment. (Hydrology, Chemistry)

Ecosystem Model -- Develop a computer based model that would relate herbivory by large mammals to vegetation types and productivity, and fire dynamics. The model would help to achieve integrated resource management goals. (Ecology)

Wildlife Biology, Natural Resource Management, Computer Science, Fire Ecology)

Wild Turkey – Determine the population trends of introduced turkeys, their ecological and biological relationships to native gallinaceous birds, and the relative carrying capacity for these species. (Avian Ecology)

Cottonwood Groves – Investigate the life cycle of the cottonwood groves, rates of recruitment, and susceptibility to rodent predation. Explore the options for regeneration, rejuvenation, preservation, and the effects of human development in these areas. (Forestry, Ecology, Plant Ecology)

Prairie Dogs – Study the effects of natural and artificial population regulating mechanisms, the importance of prairie dogs to the park environment including other wildlife, and the prairie dog contribution to the prey base and their relationship to predators. (Wildlife Biology, Vertebrate Pest Management)

Black-Footed Ferret – Determine the feasibility for future reintroduction of the endangered black-footed ferrets. Study the existing prey base, location and juxtaposition of prairie dog colonies, and other factors necessary for successful ferret population rehabilitation. (Wildlife Biology)

Swift Fox – Determine the suitability of habitat for and the feasibility of reintroducing the northern swift fox. (Wildlife Biology)

Acid Rain – Investigate the effects of individual and cumulative acid precipitation events on organisms that require ephemeral pools to complete various life-cycle stages. (Invertebrate Zoology, Biology, Chemistry)

Trail Riding – Study the effects on soils, especially from erosion and compaction, and other natural resource disturbance from trail riding activities. (Soil Science)

CULTURAL RESOURCE RESEARCH NEEDS

Contexts of Significance – Prepare the prehistoric and historic contexts of significance that will be used in evaluating cultural properties for the National

Register of Historic Places. This project can be done as one or two projects. (History, Archeology)

Little Missouri Badlands History – Document the Little Missouri Badlands history, focusing on the park, from the first known entry into the region up to the present. Document homesteading and historic land use. (History)

Historic Land Use and Vegetation – Document the location, land use, and duration of various historic land management practices; map historic land use patterns and locations; and report the extent and type of past human impact on vegetation patterns. (History)

Museum Collection – Maintain and update the inventory and compilation of the park's museum collection. (Museology)

WHO TO CONTACT:

Resource Management Specialist
Theodore Roosevelt National Park
Medora, ND 58545
(701) 623-4466



Timpanogos Cave National Monument

PARK DESCRIPTION:

Timpanogos Cave National Monument is located in Utah County, Utah. The 250-acre monument is situated in the rugged and scenic American Fork Canyon. The primary resources are three limestone caves connected by man-made tunnels. Stalactites, stalagmites, and other common features are preserved, but it is the tremendous number of helictites that makes the caves unique. Helictites are small cave features which twist and turn into strange and fantastic shapes as they grow from the cave walls and ceiling.

NATURAL RESOURCE RESEARCH NEEDS:

Cave Development -- Study the cave features to determine and document the probable cave development sequence consistent with current cave origin theories. Determine the approximate age of the caves and their age relative to each other. (Geomorphology, Speleology)

Cave Weathering -- Study the carbon dioxide levels in the cave (air and water) and determine if the 80,000 or more visitors are affecting this level. (Geomorphology, Speleology)

Cave Hydrology -- Determine the effects of unnatural water fluctuation on the cave's resources caused by pumping. (Hydrology, Speleology)

Surface Flora and Fauna -- Complete the baseline flora/fauna inventories data and verify the accuracy of the current data. (Zoology, Botany)

Rare and Endangered Species Inventory -- Survey the entire park area (250 acres, extremely steep) for the presence, population densities, and distribution of federally- and state-listed rare, endangered, or

threatened species. (Botany, Zoology, Entomology, Taxonomy)

CULTURAL RESOURCE RESEARCH NEEDS:

Museum Collection -- Inventory and catalog the park museum collections, identify the preservation or conservation needs, and develop recommendations to implement treatments in compliance with National Park Service cultural resources management guidelines (NPS-28). (Museology)

WHO TO CONTACT:

Chief of Interpretation and Resource Management
Timpanogos Cave National Monument
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American Fork, UT 84003
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Wind Cave National Park

PARK DESCRIPTION:

Wind Cave National Park was established by Congress in 1903 to preserve and manage the surface and cave resources in an area along the southeastern flanks of the Black Hills in western South Dakota. The area protects prime examples of both the Great Plains prairie ecosystem and the ponderosa pine forests of the western United States. The park has over 50 miles of mapped and explored cave passageways. The 28,000-acre park has many species of native wildlife including sharp-tail grouse, golden and bald eagles, coyote, bobcat, elk, bison, pronghorn, mule deer, and prairie dogs. Both historic and archeological resources appear to be prevalent, but have only recently begun to be studied.

NATURAL RESOURCE RESEARCH NEEDS:

Plant Communities - Identify and map the major plant communities. (Botany, Plant Ecology)

Aquatic Resources - Survey and describe the status of aquatic and semi-aquatic plant and animal species. (Botany, Zoology)

Climate and Vegetation - Assess the long- and short-term effects of various climatic factors, e.g., precipitation on plant species and communities. Develop a system that would monitor these effects. Information on these effects will be used to better interpret the results of research and resource management programs. (Botany, Plant Ecology, Soil Science, Climatology)

Avian Predator Populations - Develop information pertaining to the populations of hawks, owls, and eagles and their influence on prey species popula-

tions. Survey the park for nesting habitat for avian predator species. (Ornithology, Wildlife Biology)

Sharp-tail Grouse Status - Develop information on habitat preferences, fire influence on nesting and feeding activities, and predation to provide an explanation for the apparent decline of the sharp-tail grouse population in recent years. (Ornithology, Animal Ecology)

Exotic Plants - Survey the extent of invasion of a dozen or more exotic plant species that are common in the park. (Botany, Plant Ecology)

Insects - Inventory insect species using ecological (trophic) as well as taxonomic collection approaches. (Entomology, Invertebrate taxonomy)

Cave Fauna - Identify the species and determine their distribution. Research the effects of above ground development and impacts from cave users on cave fauna. (Zoology, Microbiology, Taxonomy)

Effects of Introduced Materials and Energy Sources on Cave Resources - Quantify and evaluate the effects of introduced materials and energy sources such as body heat, human hair, skin flakes, lint, and the electrical system on cave fauna, formations, and other cave resources. These materials and sources introduce unnatural energy (heat and light) and nutrient sources into the cave. (Ecology, Zoology)

Cave Waters - Study the surface and subsurface water to determine where limestone enters into the solution and subsequently precipitates. This would increase the understanding of the dynamics of the cave formation process. (Mineralogy, Hydrology, Geology, Speleology)

Cave Air Circulation Patterns -- Determine the effects of artificial access areas (elevator shafts and the walk-in entrance) on air circulation patterns, humidity, and temperature. (Atmospheric Science, Speleology, Geology)

Cave Resources -- Study cave fauna, speleothems, or other cave resources. (Speleology, Zoology, Geology)

CULTURAL RESOURCE RESEARCH NEEDS:

Historic Resources -- Map the locations of pre-park, historic period human activities (homesteads, trap-per cabins, mines, etc.). (History)

Archaeological Resources -- Survey select areas such as Boland Ridge, Wind Cave Canyon, and Beaver Creek drainage and evaluate the sites located for possible nomination to the National Register of Historic Places. (Archeology)

Contexts of Significance -- Prepare prehistoric and historic contexts of significance that are to be used in evaluating cultural properties for the National Register of Historic Places. This can be addressed as one or two projects. (History, Archeology)

WHO TO CONTACT:

Natural Resources:

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Cultural Resources:

Chief of Interpretation
Wind Cave National Park
Hot Springs, SD 57747
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Yellowstone National Park

PARK DESCRIPTION:

Yellowstone National Park was established in 1872 'as a public park, for the benefit and enjoyment of the people' and 'for the preservation of all timber, mineral deposits, natural curiosities, or wonders, in their natural condition.' The modern purpose of the park is to perpetuate a large natural system in as near its original condition as possible for inspirational, educational, cultural, and scientific values.

Yellowstone was designated by United Nations Educational, Scientific and Cultural Organization (UNESCO) as a United States biosphere reserve for its unique geothermal features, and as a World Heritage site based on its universal value to mankind.

Yellowstone represents the flowering of the national park idea. As a natural area, it is a geologic window to the earth's interior that records the evolutionary history of the earth throughout the last 55 million years. Yellowstone's hydrothermal features demonstrate ongoing geologic processes. As an area for biological evolution, the park protects about 1,000 plant species and 57 mammal species. Yellowstone's unique geysers, hot springs, mud pots and fumaroles, its exceptionally beautiful Grand Canyon of the Yellowstone River, and its 41 waterfalls, scenic lakes, and mountains give the area world standing. Yellowstone also provides refuge for rare and endangered species such as the threatened grizzly bear, the rare mountain lion and wolverine, bald eagles and trumpeter swans, Yellowstone cutthroat trout, and arctic grayling. The park also contains the last wild, free-ranging herd of bison in the United States. All of these are conserved in an intact ecosystem relatively unaltered by human activity. At the same time, the park also preserves cultural resources of its prehistoric and historic periods.

NATURAL RESOURCE/SOCIAL SCIENCE RESEARCH NEEDS:

Yellowstone River Cutthroat Trout -- Establish the annual movement patterns of the cutthroat trout in the section of the Yellowstone River between Fishing Bridge and Sulphur Cauldron. (Fishery Biology)

Fish Food Habits -- Study the food habits of fish species in Yellowstone Lake with emphasis on possible interspecific competition. (Fishery Biology)

Bison and Elk -- Study the behavior of bison and elk in Hayden Valley and Lamar Valley to determine the use patterns in riparian areas and adjacent uplands. (Wildlife Biology)

Yellowstone Lake Cutthroat Trout -- Establish the age and growth patterns for cutthroat trout on Yellowstone Lake using various aging techniques, including verification. Estimate the juvenile cutthroat trout escapement from tributaries to Yellowstone Lake. (Fishery Biology)

Cutthroat Trout (Parkwide) -- Evaluate the genetic variability among populations of Yellowstone Lake Cutthroat Trout within Yellowstone National Park using electrophoresis and other techniques. Also, evaluate the possibility that hybridization is occurring in the cutthroat trout population. (Genetics, Fishery Biology)

Brown and Lake Trout -- Study the life history of the brown and lake trout in Lewis and Shoshone Lakes. (Fishery Biology, Ichthyology)

Brown and Lake Trout -- Study the food habits of the brown and lake trout in Lewis Lake. (Fishery Biology)

Hydrology – Study the interaction and movement between Hebgen Lake and the Madison River in Yellowstone National Park. (Hydrology)

Aquatic Flora and Fauna – Evaluate the aquatic flora and fauna along a pH gradient in a naturally acidified stream. (Aquatic Ecology, Chemistry)

Piscivorous Avifauna – Determine the feeding habits of piscivorous avifauna in the Yellowstone Lake drainage. (Ornithology, Avian Ecology)

Trout Mortality – Evaluate the mortality associated with post-capture release of angler-captured trout in the Firehole River. (Fishery Biology)

Natural Area – Evaluate the living resources of Lewis and Shoshone Lakes. (Biology)

Heart Lake Fish – Study the life history of sport fishes in Heart Lake. (Ichthyology, Fishery Biology)

Lake Trout Reproduction – Compare the reproductive biology of lake trout to the Great Lakes lake trout. (Ichthyology)

Riparian Habitat – Initiate the inventory of riparian habitat in naturally grazed and ungrazed areas in Yellowstone National Park. (Ecology)

Canada Goose – Study the ecology of the Canada goose. (Avian Ecology)

Reptiles and Amphibians – Describe the distribution and habitat requirements of native reptiles and amphibians. (Herpetology)

Small Mammals – Describe the distribution and habitat requirements of *Onychomys*, *Peromyscus*, *Sciurus*, and *Leopoldus*. (Wildlife Biology)

Insects – Quantify the effects of arthropods on the dynamics of the park ecosystems, particularly in the grasslands of the northern elk winter range. (Ecology)

Pocket Gophers and Ungulates – Define the role of pocket gophers in the dynamics of plant communities and ungulate grazing on the northern elk winter range. (Wildlife Biology, Ecology)

Endangered Plants – Identify the endangered or threatened endemic non-vascular plants in the hot springs areas. (Plant Taxonomy, Botany)

Coyotes – Restudy the ecology of coyotes to update Adolph Murie's classic work of 1940, and as a baseline for the possible restoration of the endangered gray wolf population. (Wildlife Biology)

Black Bear – Study black bear ecology to complement the work done on the endangered grizzly bear by the Interagency Grizzly Bear Study Team, and to update the work of V.G. Barnes, 1967. (Wildlife Biology)

Lynx and Bobcat – Assess the role of lynx and bobcats in the Yellowstone ecosystem. (Wildlife Biology)

Wolverine – Evaluate the status and ecological niche of the wolverine in Yellowstone before and after the possible restoration of the endangered gray wolf. (Wildlife Biology)

Visitors and Wildlife Management – Analyze strategies and develop effective media to prevent visitors from approaching large wildlife and handling from and feeding small mammals and birds. (Sociology, Interpretation, Wildlife Biology)

Exotic Vegetation – Develop innovative means to control exotic vegetation. (Pest Management)

CULTURAL RESOURCE RESEARCH NEEDS:

Historic Resources Base Map – Prepare maps for all architectural and historic features to identify significant resources, sites, and event locations for human history in Yellowstone. (History, Architecture)

Trail History – Prepare a history of trails in Yellowstone including origins, locations, construction, and the philosophy behind providing this type of facility. (History)

Bannock Indian Trail – Locate, inventory, and evaluate the parkwide historic Bannock Indian Trail. (History)

Historic Vehicles – Prepare a history and interpretive report on the existing historic vehicles, including

wagons and motor coaches. Specify curatorial needs and make suggestions for displaying the vehicles. (History, Interpretation)

Museum Collection – Update the curatorial records to comply with new National Park Service procedures. (Museology)

Historic Furnishings – Inventory, catalog, and evaluate the significance of the historic furnishings of the old hotels, and prepare a collection management plan for them. (History)

Historic Architecture – Prepare an interpretive guide to the historic architecture in Yellowstone. A sub-category of the guide would focus on the rustic architecture focusing on the National Historic Landmark buildings. (Architecture, Interpretation)

Old Faithful Inn – Prepare a Historic Structure Preservation Guide for the Old Faithful Inn. (Architecture)

Historic Sites – Inventory, record, and evaluate significant sites, including the town site of Cinnabar, cemeteries, trapper cabins, and other sites. (History, Archeology)

Photographs – Locate, describe, and evaluate the significant collections of Yellowstone photographs. (History)

Art – Locate, photograph, and evaluate works of art (i.e., painting, prints, etc., but not photographs) about Yellowstone. (Art History)

Museum Collection – Develop a computerized catalog and indexing system for the historic photograph collection. (Museology)

Bibliography – Compile a bibliography of reports, maps, and other material concerning Yellowstone's boundaries. Write a history of the work done to locate and mark the park's boundaries. (History)

Landscape Architects and Yellowstone – Prepare a history on the role and influence of landscape architects in the park's development. (History, Landscape Architecture)

Geology – Prepare a history on the evolution of the geologic interpretation/understanding of thermal

systems and other aspects of Yellowstone's geology. (History, Geology)

Fossil Forests – Prepare a case study on the history of science, exploration and explanation of Yellowstone's fossil forests. (History, Paleontology)

Automobile Management – Prepare a history on the Yellowstone managers' reaction and adaptation to the advent of the automobile. (History)

Fire – Prepare a history on fire and forest management in Yellowstone including insect control and changing views of the forest as a park resource. (History)

Park Photographers – Prepare a history on photographers in Yellowstone other than F. J. and Frank Haynes. (History)

Human-Bear Interaction – Compile information sources and a history about bear/human interactions in Yellowstone during the years when they were common. Use oral history techniques. (History, Interpretation, Sociology)

Outfitting History – Prepare a history on the evolution of outfitting as a park use. (History)

Poaching History – Research poaching in Yellowstone, a persistent problem throughout the history of the first national park. (History)

Superintendency – Prepare a history of the Yellowstone superintendency (autonomy vs. central control). Study the functioning of bureaucracy and the interaction between the central office, local managers, and decision makers. (History)

Park Ranger – Prepare a history on the evolution of the park ranger profession using oral history techniques primarily. (History)

Park Maintenance – Prepare a history on park maintenance including its organization, role, and prominence in park management and decisions. (History)

Park Maps – Prepare a history of cartography in Yellowstone including an annotated catalog of the maps. (History)

Concessions – Prepare a history of concessions facilities, policies, and business practices. (History)

Legislative History – Update the legislative history from the 63rd Congress through the present. (History)

Master Plans – Prepare a study on the development and philosophy behind the park master plans beginning with the earliest (1931). (History)

Mission 66 Projects – Prepare a study on the role and philosophy of the Mission 66 program in the park's development. (History)

Civilian Conservation Corps (CCC) – Prepare a study on the role of the CCC in the development of Yellowstone including organization, projects, so accomplishments, etc. (History)

Archaeology – Undertake a systematic survey and evaluation of the sites eligible for the National Register of Historic Places. Potential sites include Lake Yellowstone's eastern shore, the Madison River drainage, portions of the Lamar River, and other areas. (Archaeology)

Contexts of Significance – Prepare prehistoric and historic contexts of significance that will be used in evaluating cultural properties for the National Register of Historic Places. This can be addressed as one or two projects. (History, Archaeology)

WHO TO CONTACT:

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Zion National Park

Pipe Springs National Monument

PARK DESCRIPTION

The erosional features of Zion were originally protected by Presidential Proclamation in 1909 when President William H. Taft established Mukuntuweap National Monument. In 1916 the monument was enlarged and renamed Zion National Park to protect unusual archeological, geologic and geographic interests, and to provide for visitor enjoyment of its grandeur and scenic features. Because of the deeply carved canyons and isolated mesa tops, Zion contains a great diversity of plants and animals. Many of these species are rare, endemic, or endangered. The complexity of the ecosystems in Zion has made it difficult to develop baseline resource inventories. The area also contains evidence of prehistoric occupancy over most of the area.

NATURAL RESOURCE RESEARCH NEEDS:

Ecological/Hydrological Relationships - Survey the riparian ecosystems and determine conditions for their perpetuation. (Ecology, Aquatic Ecology, Botany, Zoology)

Geologic Hazards - Identify the geologic hazards that could create safety problems for visitors, and could damage park roads, structures, and other capital investments. (Geology, Engineering, Park Management)

Exotic Plants - Locate, identify and map exotic plant species. Recommend techniques to remove them from the area and to restore the native species. (Botany, Plant Taxonomy, Pest Management)

Spotted Owls - Determine the range, needs, and reproductive levels of the Spotted Owl (*Strix occidentalis* *discrepans*) a rare species in Utah. Determine if visitor use or park activities are causing a decline in the population. (Ornithology, Avian Ecology)

Mountain Lion - Ascertain the range and status of the mountain lion (*Panthera concolor*) in Zion. Determine the population's health and whether park activities create problems for their survival. (Biology, Mammalogy)

Desert Bighorn Sheep - Determine the extent of suitable habitat for desert bighorn sheep (*Ovis canadensis* *montanus*) and the herd size that the area can support. (Range Science, Wildlife Biology)

Acid Rain - Determine the extent of acid rain problems in the area and how ecosystem parameters are being affected. (Meteorology, Ecology, Hydrology, Plant Ecology)

Zion Snail - Determine the habitat requirements, reproduction, and current status of the Zion snail (*Patinozoma zionis*). (Biogeography, Invertebrate Zoology)

Bull's Viper - Determine the nesting requirements and the current status of Bull's Viper (*Viper* *bullis*). Ascertain if exotic tamarix invasion has affected nesting habitat. (Ornithology, Ecology)

Gambel's Quail - The Gambel's Quail (*Callipepla gambelii*) has been declining in Zion Canyon over the past few years. Determine the causes and recommend corrective action to protect the species, which is rare in park. (Ornithology, Avian Ecology)

Soil Conditions - Survey soil conditions and trends. Determine if the conditions/trends are natural or are

being accelerated by human activities. (Soil Science)

CULTURAL RESOURCE RESEARCH NEEDS:

Archaeological Survey Completion -- Survey the unsurveyed portion of the park and establish priorities to complete the work. (Archeology)

Stabilization of Ruins -- Evaluate and prioritize the known ruins for stabilization projects. (Archeology, Architecture)

Museum Objects -- Evaluate the museum collection to determine if any special treatment techniques are necessary or storage problems are evident. (Museology)

Historic Period Archaeological Sites -- Research and evaluate the archaeological sites. (Archeology)

Historic Resource Base Map -- Verify the site location and information on all known historic cultural resources and consolidate into one map format. (History)

Regional History -- Research and document the regional history that shaped and affected Zion. (History)

Administrative History -- Update, correct, and finish the administrative history. A draft was prepared in 1982 but was never finished. (History)

Contexts of Significance -- Prepare the prehistoric and historic contexts-of-significance which will be used to evaluate cultural properties for eligibility to the National Register of Historic Places. This could be separated into historic and prehistoric contexts if desired. (History, Archeology)

WHO TO CONTACT:

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